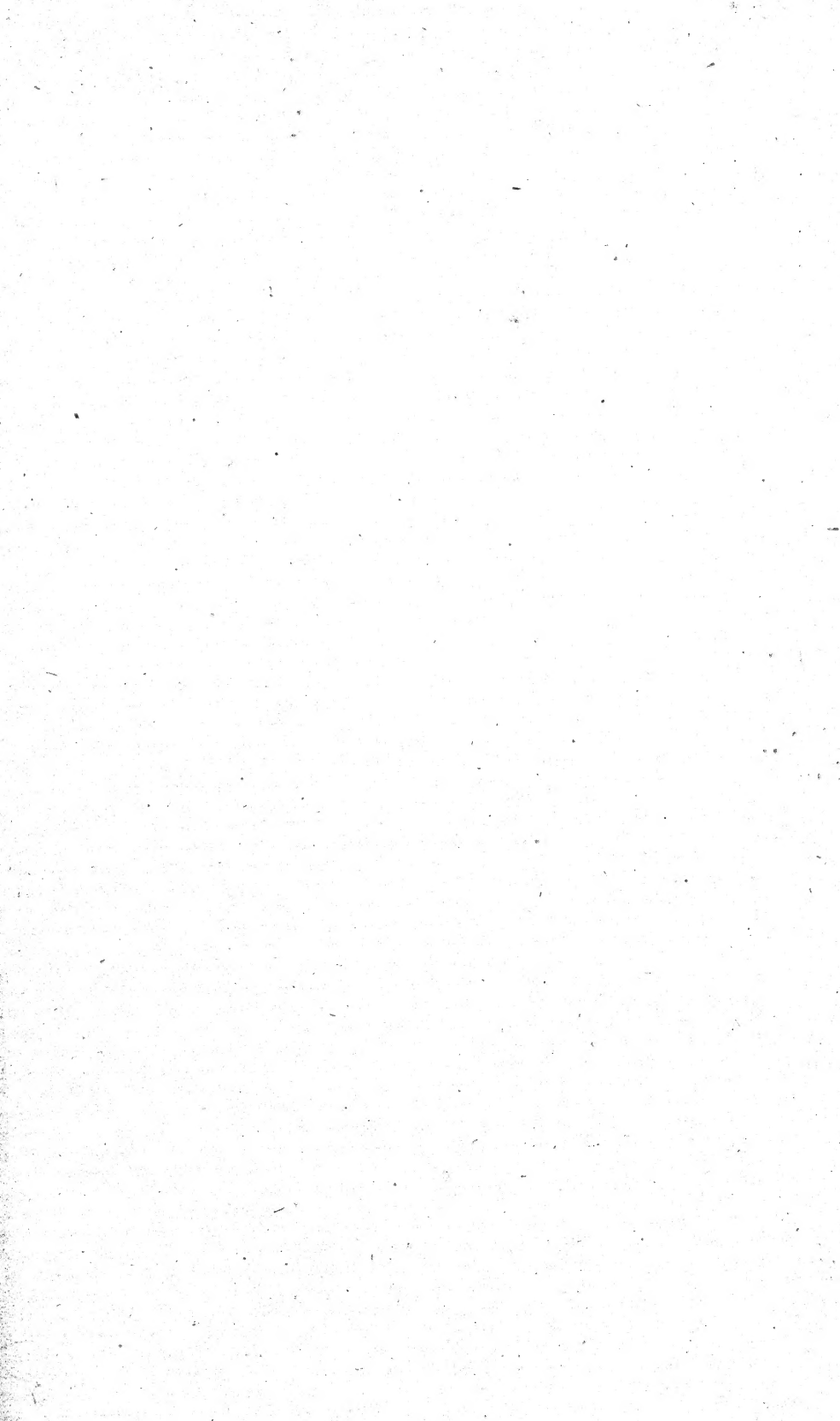


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DEPARTMENT OF AGRICULTURE, VICTORIA.

ILLUSTRATED
DESCRIPTION OF THISTLES,
ETC.,

INCLUDED WITHIN THE PROVISIONS OF THE

THISTLE ACT OF 1890.

Mueller, F. V.

By Authority:

ROBT. S. BRAIN, GOVERNMENT PRINTER, MELBOURNE.

1893.

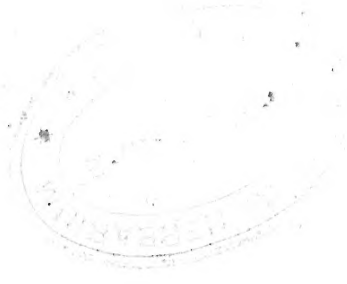
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A NUMBER of inquiries having been made to this Department by public bodies and private persons, desirous of obtaining information respecting various Thistles which have taken root in Victoria, it occurred to me that the publication of a coloured illustrated description would be of value in many ways. Having communicated with Baron Sir F. von Mueller, the Government Botanist, on the subject, that gentleman very kindly undertook to provide such a work, and I acknowledge my indebtedness to him.

I trust that his labours in preparing so clear and comprehensive descriptions will have the effect of making generally known the distinguishing characteristics of those members of the Thistle family dealt with by the Thistle Act.

Copies of the publication will be supplied gratis to Shire Councils, Agricultural Societies, Free Libraries, and State Schools, also to Farmers and Graziers on application.

D. MARTIN,
Secretary for Agriculture.

Department of Agriculture,
Melbourne, April, 1893.

32302

DESCRIPTIONS AND ILLUSTRATIONS
OF
THISTLES AND ALLIED PLANTS

REQUIRED TO BE DESTROYED UNDER THE THISTLE ACT OF 1890.

THIS unpretensive publication arose from a desire of facilitating an exact knowledge of those plants which, under the above-mentioned Statute, come to public notice, and should therefore be elucidated in a manner admitting of no uncertainty of recognition. Chromo-lithographic illustrations, as well as descriptions of all the Thistles and thistle-like plants mentioned in the Act are now provided, so that anywhere the various species might be identified locally with more ease, whereby the necessity for obtaining departmental information in this direction will be very much lessened. Further on in this introductory text the principal characteristics of the Thistles here under consideration have been briefly contrasted; thus as far as possible tedious comparisons of the lengthened descriptive records will be avoided, should glances on the respective pictures not prove at once sufficient for any information anywhere sought.

As for rural purposes it is desirable that the naming of the Thistles here hitherto immigrated and copiously spread should be as free from complication as possible, it was deemed best to adhere to the systematically scientific names, the vernaculars being subject to much local vacillation; but to simplify the nomenclature, the generic name *Carduus* in the Linnéan sense is maintained, so that the modern generic appellations *Cnicus*, *Cirsium* and *Silybum* are given merely as synonyms for the true Thistles. Perplexing popular names of very limited significance are omitted. The descriptions may seem unnecessarily effuse; but to distinguish the Thistles, now already here required to be elucidated, from allied additional species, which are sure at some future time to invade our colonial territory, a full account of each sort becomes needful. In identifying any kind of true Thistles, it should also be borne in mind that hybrids occur not rarely among them, rendering their specific recognition not always easy. It has further been considered desirable to offer some few remarks on the best method of suppression of these troublesome weeds, not for experienced farmers, but for such settlers, who as colonists enter on rural pursuits for a new occupation of life. In coping with plants of this kind

two distinct means must be kept in view as necessary. When annual weeds are to be dealt with, the difficulty is not so great as in those cases where perennial plants have to be subdued. Whatever method is adopted for getting rid of plants seeding only once from the same root when left undisturbed, it reduces itself to acting on the principle of destroying the plants before they can ripen any seeds. In the case of Thistles and allied plants of annual growth, when the individual plants are cut or lifted, they should immediately be brought into heaps and be burned at once, otherwise the seeds may ripen still on the plants; inasmuch as though dislodged or cut, they are apt to retain vitality for some considerable time while on the ground, all Thistles being succulent and slow in drying up. The difficulty of dealing successfully with Thistles and other weeds of perennial growth is much greater; and regretably the worst of all European Thistles, *Carduus arvensis*, has in late years made its appearance also here. The difficulty of its eradication is augmented, because the root is ramified and fragile; besides, the smallest portion left near the surface will continue to grow. Here it may incidentally be mentioned, what Dominique Villars already asserted, in the last century, that *Carduus arvensis* could best be subdued by not interfering with it till after flowering. So it would seem, that the root gets much exhausted by the far advancing growth of the plant, without the danger of seeds ripening being readily incurred by this almost unisexual Thistle. Villars pointedly says, that by any early cutting the plant would increase in all directions from the root. As this *Carduus* is in our colony of comparatively recent introduction, this advice could not yet be much brought to test here; it is not applicable however to Thistles of only annual duration, and would probably be neither of avail, when *Carduus arvensis* has become a plant of several years' age.

It would seem, that for providing an expeditious, effective, and uncomplicated "Weeds-Destroyer," the ingenuity of invention can still further be exercised, with a view of superseding to some extent manual application by usual hoes, forks, scythes, spades, ploughs or other tools.* Beyond the ordinary operations and implements in rural use for the destruction of weeds of various kinds, some contrivances exist perhaps not yet adopted here. Thus attention is directed, where locality admits of application, to a particular "Paring Plough," which cuts the roots readily under the surface, and thus prevents the plant forming several side-stems, as it is prone to do when cut just above ground. In some cases depasturing can be resorted to, particularly by sheep, and perhaps goats and pigs, as the continued deprivation of stem and leaves becomes at last detrimental to the root; thus sheep will nip off the young sprouts of *Carduus arvensis* with avidity; and if this is carried on sufficiently long, the roots will perish of exhaustion. The

* Here the "Thistle-hoe" (a small lifting spade) and the "Thistle-chopper" are chiefly utilized.

destruction of the small Rumex-Sorrel (*Rumex Acetosella*, L.) can be aided by sowing broadcast repeatedly turnips between, and feeding off through sheep the united young growth, the sorrel as the weaker plant getting suffocated and tramped out. Pigs will devour as well Thistle-roots as Bracken-roots, and by keeping the animals within hurdles, moved gradually over the ground, the annihilation of these plants can be effected more readily on some places than by other means. It should be further taken into consideration, that in the winterless clime of our lowlands the growth of weeds proceeds more or less through the whole year, and this renders coping with such plants here far more onerous than in countries where the length and severity of the winters annihilate largely such plants and their seeds. Therefore, the Australian ruralist has far more perseveringly to bring his operations to bear for the suppression even of mere annuals. To deal with obtrusive plants of perennial growth is, of course, still far more complicated, as our experiences show with such plants, for instance, as the Sorrel-Rumex, the Bracken-Fern, the Furze, the Briar-Rose. Hitherto the Thistle and cognate plants which have invaded our colony are all annuals, except *Carduus arvensis*, above alluded to. This can further be distinguished from the other Thistles, with us hitherto naturalized, by perfect male and perfect female flowers being developed by separate individual plants only. *Carduus arvensis* is a "Plume-Thistle," that is to say, the tuft on the summit of the seed-like fruits consists of plumous bristlets. As yet only one more real Plume Thistle is widely naturalized in our colony, the very common *Carduus lanceolatus*, the other remaining genuine *Carduus*, namely *C. pycnocephalus*, has simply hair-like bristlets of the tuft. These easy distinctions as regards the "pappus" are observable already in the young flower-headlets.

For further facilitating the use of the plates and the descriptions of the nine plants recorded here, it may introductorily be noted that the Heraldic Scotch or Onopordon-Thistle, which in its less grey state bears some resemblance to *Carduus lanceolatus*, has the inside bottom of the flower-headlets, so to say, honeycombed, and not beset with capillary bristlets; while the Spotted Thistle, *Carduus Marianus*, is known well enough everywhere by the vernacular name, signifying as if a milky fluid had been sprinkled on the foliage. The *Centaureas* are spurious Thistles; and as we have hitherto to attend only to two, their discrimination is quite easy by the mere colour of the flowers, purple in *Centaurea Calci-trapa*, yellow in *Centaurea Melitensis*. The only other yellow-flowering plant coming under notice on this occasion is the very conspicuous Saffron-Thistle, *Kentrophyllum lanatum*. Thus it solely remains under the Thistle Act to recognise the so-called Bathurst-Burr, a plant very different from the eight others treated in this essay, and so distinct that it in no way can be called a real Thistle.

As the first effort of an artist, who on this occasion had to be initiated into plant-drawing, the coloured delineations now offered must be regarded as fairly creditable. Some imperfections have been amended in the full descriptions elucidative of the illustrations. Furthermore, these plates of a publication, which the Agriculture Department intends to distribute very widely over our colony, will perhaps, along with the descriptive letter-press, thus serve also educational purposes, at drawing lessons and at botanic teachings. That delineations of plants of so large a size had to be brought within such narrow pictural space, arose from the necessity of rendering this little treatise conformous to the other literary issues of the Victorian Agricultural Department.

To the Honorable the Minister and the Secretary of the Agriculture Department I beg to tender my best thanks for providing the means and for other facilitations afforded to elaborate this publication.

I.

CARDUUS LANCEOLATUS, LINNÉ.

(*Cnicus lanceolatus*, G. F. Hoffmann ; *Cirsium lanceolatum*, Scopoli.)

The Spear-Thistle, called also but inaccurately the Scotch Thistle ; one of the Plume-Thistles.

Indigenous to Europe, Western Asia, and Northern Africa ; here the commonest and most readily spreading of all Thistles.

A formidable plant. Height to several or even many feet, but only once flowering from the same root under ordinary circumstances. Stems and branches robust, furrowed, beset with mostly crisped hairlets. Leaves decurrent, the largest when well developed to one foot long, mostly pinnatifid, but some particularly the upper less divided, often also irregularly prickly denticulated ; on the upper side rough from minute straight rigidulous hairlets ; on the lower side more or less bearing a lax somewhat webby or cottony but not close vestiture, or rarely quite whitish-lanuginous ; the lobes often almost semilanceolar, undivided or some incised, always terminated by a conspicuous pungent spinule. Headlets of flowers erect, comparatively large, approached by diminutive floral leaves, singly terminating branches, or two or more rather near together by the shortness of approaching branchlets. Involucre almost globular or somewhat ovate, soon open, consisting of numerous conspicuous rigid spinescent and mostly spreading bracts lanceolate or subulate-linear in form, and usually bearing some weblike vestiture below, the innermost hardly pungent. Receptacle copiously beset between the flowers with setular-capillary bracts. Corolla of the flowers upwards purplish (shown in our analytic plate hardly of a sufficiently bright tinge), thinly tubular to the middle, towards the summit

dilated and produced into five narrow lobes. Filaments of the stamens disconnected, beset with some hairlets; the five anthers united into a tube, purplish, sagittate-linear, their pollen pale. Style capillular-filiform, glabrous; the two stigmas very slender, purplish, soon exserted, coherent except at the summit. Fruits seed-like, obliquely cuneate-ellipsoid, compressed, but also latterly angular, glabrous, outside pale yet shining, smooth. Pappus somewhat shorter than the corolla, consisting of whitish hygroscopic capillary and distantly plumous setules, finally much expanding and seceding, but often carrying the fruit with its solitary seed widely through the air, as in the case with all true *Carduus* Thistles. In cold climes this, like many other Thistles, is regarded as biennial; and here also it may pass into a second year if the growth becomes retarded or interrupted.

Although the specific name is constantly ascribed to Linné, it occurs already in Ray's works, if not before in Gerarde's, with precisely the same wording, and it was indicated even by J. and C. Bauhin.

Explanation of Plate I.

- a.* A flowering branch with its leaves, natural size.
- b.* 1. Longitudinal section of a headlet of flowers.
2. A complete flower, with young fruit, also bracteal bristlets and pappus.
3. A separate corolla.
4. Stamens flattened out.
5. Style and stigmas.
6. Fruit.
7. Transverse section of a fruit, showing the two cotyledons of the seed.
8. Embryo.
9. A bracteal bristlet.
10. A pappus-bristlet.
- 1-10. Magnified, 1 slightly so, the rest to various extent.

II.

CARDUUS ARVENSIS; TABERNÆMONTANUS.

(*Cnicus arvensis*, G. F. Hoffmann; *Cirsium arvense*, Scopoli; *Serratula arvensis*, Linné.)

The perennial Thistle (called also, but incorrectly, the Canadian and the Californian Thistle), one of the Plume-Thistles, easily recognised by its perennial root and by having staminate and pistillate flowers perfected only on distinct plants, and these not always intermixed. Indigenous to Europe, Western Asia, and Northern Africa. The most mischievous of all immigrated Thistles, on account of the very great difficulty encountered in its eradication.

Height usually up to some few feet. Root thick, spreadingly penetrating to a gradually great length and depth through the soil, hence much ramified, very tenacious of vitality, the ramifications of the root brittle. Stem furrowed, variously branched, particularly the upper portion, as well as the peduncles often somewhat lanuginous. Leaves, unless the lower, sessile, usually not decurrent or only slightly so, pinnatilobed or only short-sinuated or some almost entire, often crisped, pungent-pointed and spinular-denticulated, often nearly glabrous, or on below scantily webby-lanuginous. Headlets of flowers generally stalked and somewhat paniculated, upright, of two forms; those with perfectly polliniferous anthers on individual plants distinct from those producing fertile seeds and larger, with more exserted flowers; male involucre more semi-globular; female involucre more truncate-ovate; involucrating bracts comparatively small, much appressed, from broad to narrow lanceolar and slightly fringed, the lower the broadest and short-spinulous at their apex, the upper gradually the longest and hardly or not at all pungent, all imperfectly fringed with minute hairlets, often of a rather dark hue. Receptacle bearing capillary-setular bracts between the flowers. Corolla pale-purplish or more lilac, seldom white, its five lobes much longer than broad, bluntish, suddenly emerging from the very slender tube. Stamens alternate to the corolla-lobes, their filaments disconnected, rough; anthers arrow-shaped linear, in the male plant perfect and therefore pollen-bearing. Style thinly filiform; the two stigmas narrow but conspicuously broader than the style, and except at or towards their summit coherent, more divergent at the upper end in the female plant; fruits seed-like, truncate-ellipsoid, smooth, shining, less readily maturing than in most other species (the lithographic colouration incorrect). Pappus fragile, consisting of distantly plumous setules, finally seceding, those at least of the female plant conspicuously overreaching the corolla.

The most difficult of all our Thistles to subdue, though less copiously producing seeds fit to germinate.

Explanation of Plate II.

- a. Perfect staminate plant; flowering branch with its leaves, natural size.
1. Longitudinal section of a headlet of flowers; aside an enlarged floral bract.
2. A separate corolla, the stigmas emerging.
3. Corolla, laid open, showing also the stamens.
4. A perfect anther, with part of the filament.
5. Side and back view of sterile stigmas with their style.
6. A sterile fruit.
7. Pappus.
8. A separate pappus-bristlet.
- 2-8. Magnified, but to various extent.

- b. Perfect-pistillate plant, flowering branch with its leaves, also portion of the root and some young shoots; natural size.
1. Longitudinal section of a headlet of flowers.
 2. A separate corolla, anthers and stigmas also visible.
 3. A corolla, laid open.
 4. A sterile anther with portion of filament.
 - 5 and 6. Fertile stigmas with style.
 7. Pappus.
 8. A separated pappus-bristlet.
 9. Fertile fruit.
 - 2, 3, 4, 5, 6 and 8. Much magnified, but to various extents.

III.

CARDUUS PYCNOCEPHALUS, JACQUIN.

The Shore-Thistle.

Indigenous to Middle and Southern Europe, Northern Africa, and South-Western Asia.

The specific name is derived from the headlets of flowers, generally crowded, mostly without stalks at the summit of the branches.

Height of the plant up to some few or rarely several feet; only once flowering from the same root under ordinary circumstances. Leaves much decurrent, except the lowest, when most developed to several inches long, of moderate width, frequently pinnatifid, irregularly spinular-denticulated, above seldom quite glabrous, beneath often from short hairlets webby-tomentellous, the lobes partly or irregularly incised, always ending in a short spinule. Headlets rather small and remarkably narrow, erect or diverging, usually from two to five close to each other at the end of the uppermost branchlets, without any near approach of conspicuous eaves. Involucre at flowering time almost hemiellipsoid or even, somewhat cylindric, occasionally bearing a lax webby vestiture, but not unfrequently almost glabrous, the constituting bracts rather small and smooth, pale-greenish outside, inside colourless and very shining, mostly linear-semilanceolar, but the lowest verging into an ovate form, hardly any of them strongly pungent, the upper somewhat spreading—(drawn on the whole too small, and not sufficiently pointed in the lithographic plate). Flowers much less numerous within each involucre than in most other species, linear-setular smooth bracts copiously betwixt them; corolla purplish or verging into violet colour, its lower half thinly tubular, the upper half divided to beyond the middle into five very narrow lobes. Stamens alternate to the corolla-lobes, their filaments upwards disconnected, and there beset with minute hairlets. Anthers pale, united into a tube, sagittate-linear. Style

filiform, the two stigmas violet-coloured, very narrow, coherent except at the summit, encircled at the base by minute papillules. Fruit compressed, almost ellipsoid, but more attenuated towards the base; when ripe brownish, or remaining pale outside and very minutely foveolar-dotted, slightly constricted below the depressed summit. Pappus somewhat or hardly shorter than the corolla, finally deciduous, the constituting capillary setules merely subtle-ciliolated; thus this species not being a Plume-Thistle. When the branches are more broadly dilated by the decurrent leaves, then this plant as a variety bears the name *Carduus tenuiflorus* (Curtis). To this Thistle is similar *Carduus crispis*, L., which has not yet any particular hold on Victorian soil, but is likely to invade hereafter our colony also, it being of still wider range in Europe, Asia and Africa than *Carduus pycnocephalus*; it can already be recognised by leaves generally less lobed, less pungent and less rigid, by less crowded headlets with involucre much more widely spreading out, by narrower involucre bracts, also more subtle-furrowed fruits.

Explanation of Plate III.

Flowering branch with its leaves, natural size.

1. Longitudinal section of a headlet of flowers.
 2. A floral bract.
 3. A complete flower with young fruit; also bracteal bristlets and pappus.
 4. A separate corolla, the stigmas also visible.
 5. A corolla, laid open, showing the stamens.
 6. Style and stigmas.
 7. A fruit.
 8. Transverse section of a fruit; also showing the cotyledons of the seed; longitudinal section of fruit (the cotyledonar division drawn too deeply).
 9. Pappus-bristlet.
- 1-9. Magnified, 1 slightly so, the rest to various extent.

IV.

CARDUUS MARIANUS, LINNÉ.

(*Silybum Marianum*, Gärtner.)

The Spotted Thistle, called also the Maria-Thistle and the Milk-Thistle. Indigenous to Southern Europe, Northern Africa, and South-Western Asia. The generic name *Silybum* is recorded as the Roman one by Plinius, and originated from the vernacular of the plant in the ancient Greek language. Next to *Carduus lanceolatus*, hitherto the most frequent Thistle here.

Height to several feet. Flowering under ordinary circumstances only once from the same root. Stem robust, much streaked and rather angular, occasionally the upper portion somewhat beset with crisp or floccous hairlets. Leaves spacious, some to 2 feet long, the lower somewhat pinnatilobed or only sinuated, the upper with bilobed base amply clasping but otherwise often lobeless, indented, all spinular-denticulated, glabrous, shining-green and usually with whitish spots and whitish costular and venular markings. Headlets very large, soon erect, as broad as long or broader, almost flat at the base, singly terminal, often conspicuously stalked. Involucral bracts mostly of foliaceous texture, the outermost broadly stipitate, nearly cordate or semiorbicular, spinular-denticulated and spinescently long-acuminated; the more middle bracts very long and much spreading, towards the base entire and almost stalklike, though also broad and flat, thence passing into a deltoid or cordate-orbicular large dilatation, concave or channelled, irregularly spinular-denticulate and gradually terminating in a long spinule; the innermost bracts almost linear-lanceolar, more or quite entire and somewhat scarious. Flowers numerous, with very copious setulous-capillary persistent bracts between them. Corolla upwards purplish, reddish or rarely white to beyond the middle slender-filiform, then suddenly widening and cleft into five somewhat unequal linear-elliptic lobes. Stamens alternate to the corolla-lobes, their filaments for the greater part of their length connate into a tube; anthers purplish, linear-sagittate. Style filiform; stigmas somewhat broader, coherent except at the summit, purplish, soon exerted. Fruit ovate-ellipsoid, truncate, considerably compressed, smooth, with a protruding apex, outside dark-brown, with slight paler variegation. Bristlets of the pappus flattish, ciliolar-serrulated or those of the outer flowers slightly plumous, connectedly deciduous, not very much longer than the ripe fruit.

Explanation of Plate IV.

Flowering branch with its leaves, natural size.

1. Longitudinal section of a headlet of flowers.
2. A complete flower with young fruit and pappus.
3. Stamens with summit of the corolla and only upper portion of the filamental tube.
4. Stigma and upper portion of the style.
5. A bracteal bristlet and a pappus-bristlet.
6. A fruit.
7. Transverse section of a fruit, showing also the cotyledons of the seed.
8. Embryo.
- 2-8. Enlarged, but to various extent.

ONOPORDON ACANTHIUM, LINNÉ.

The Scotch Heraldic Thistle.

The generic name was written by Linné *Onopordum*, but the writing generally adopted is in accordance with the name as given by Plinius from ancient Greek authors.

Indigenous to Europe, Western Asia, and Northern Africa. Here less obstructive than the other Thistles. Height up to some few or rarely many feet, but often dwarfed. Flowering under ordinary circumstances only once from the same root.

All over or particularly the leaves beneath more or less webby-lanuginous. Leaves conspicuously decurrent, except those at the root, in outline from rhomboid-ovate to narrow-lanceolar, short-lobed or only indented, always irregularly spinescent-denticulate, sometimes glabrescent above, the lower to one foot long and occasionally some deeply cleft. Headlets of flowers singly terminating branches or approximated branchlets. Involucre truncate-globular, consisting of numerous rather small spreading upwards linear-subulate very pungent bracts, the lowest bent downwards. Receptacle honeycombed and denticular-foveolate, but devoid of setular-capillary bracts. Corollas upwards purplish-red or rarely quite white, the lower half thinly filiform, the upper half suddenly turgid, somewhat irregularly cleft into five narrow bluntish lobes. Stamens alternate to the corolla-lobes, their filaments almost glabrous; anthers connate, linear-sagittate, purplish. Style capillary; stigmas narrowly semicylindric, coherent except at the summit, with a slight basal enlargement. Fruits somewhat compressed, nearly ovate, longitudinally angular-lined, outside brown or greyish and occasionally black-spotted, conspicuously wrinkled, supported within its receptacular hollow by only a minute bract. Pappus-bristlets numerous, subtly ciliolar denticulated, at the base connate, sometimes reddish.

Explanation of Plate V.

Flowering branch with its leaves, natural size (lithographic colouration green instead of greyish).

1. Longitudinal section of a headlet of flowers.
2. Alveolar bracts of receptacle, one yet retaining its fruit.
3. A complete flower, with young fruit and pappus.
4. A corolla laid open, showing also stamens, style and stigmas.
5. A stamen separated.
6. Style and stigmas.
7. Side view of a fruit.
8. Fruit, presenting its summit.
9. Longitudinal section of a fruit across the cotyledons.
10. Longitudinal section of a fruit parallel to the cotyledons.
11. Transverse section of a fruit.
- 1-10. Enlarged, but to various extent.

VI.

CENTAUREA CALCITRAPA, LINNÉ.

The Star-Thistle.

The specific name has been chosen in allusion to the very spinular flower-headlets, its etymology being derived from the Latin name of an ancient contrivance to impede the progress of horsemen in warfare. The British vernacular has been in use since medieval times. Indigenous from Middle Europe to Western Asia and Northern Africa.

Flowering under ordinary circumstances only once from the same root. Neither tall nor robust, often much spreading and very branched, imperfectly beset with short hairlets, only occasionally reaching a height of 3 feet. Leaves rather small, unless those near the root, always lax, simply sessile, pinnatifid or the upper gradually undivided, the basal leaves sometimes doubly dissected, the lobes and undivided portion always narrow and distantly or imperfectly denticulated. Headlets of flowers singly terminal and lateral, almost sessile. Involucral bracts glabrous, at their lower portions closely appressed, dilated, pale, uniting into an almost conic-ovate form, the upper ending in a spreading comparatively long and strong spinule, excepting the innermost bracts; the spinule towards its base denticulate-spinular and somewhat channelled. Receptacle beset with numerous capillary-setular white bracts. Flowers of nearly the same length, not very numerous, the outermost generally sterile. Corolla purplish in the majority of the plants, its tube very thin, widened towards the summit, the five lobes narrow; corolla of the circumferential flowers longer lobed. Stamens irritable, alternate to the corolla-lobes, their filaments beset with very minute papillular hairlets; anthers reddish, connate, linear-sagittate. Style capillary, bearing papillular hairlets at the upper end; stigmas narrowly semicylindric, coherent except at the top. Ripe fruit glabrous, cuneate-ellipsoid, somewhat compressed, slightly biangular, at the base unilaterally impressed or almost excised, outside pale with darker striolate spots (the lithographic colouration on the plate incorrect). Pappus absent.

A very closely allied plant, showing a transit to *Centaurea Iberica* (Stephan), differs chiefly in having a short pappus, at all events to the fruits of the marginal flowers. A variety, here also already immigrated, in which the lower involucral bracts are terminated only in very short spinules, approaches *Centaurea Pamphylica* (Boissier and Heldreich).

Explanation of Plate VI.

Flowering branch with its leaves, natural size.

1. Longitudinal section of a headlet of flowers, slightly enlarged.
2. A separate corolla, showing also style and stigmas.

3. A corolla laid open, showing thus the stamens.
4. A stamen detached.
5. Style and stigmas.
6. A fruit.
7. Transverse section of a fruit, exhibiting the cotyledons.
8. Embryo.
- 2-8. Enlarged, but to various extent.

VII.

CENTAUREA MELITENSIS, LINNÉ.

The Malta-Thistle.

Indigenous to Southern Europe, Northern Africa, and South-Western Asia.

Neither this nor any other *Centaurea* is so formidable as any of the true *Carduus*-Thistles, nor do they so easily spread from seeds to far distances; flowering under ordinary circumstances only once from the same root. Vestiture short, soft, grey, partially evanescent. Height of plant to three feet or exceptionally more. Stem erect, usually few-branched, foliaceously dilated at its angles. Radical leaves of good size, narrowed into a conspicuous petiole, pinnatifid, the end-lobe largest; cauline leaves rather small, long decurrent beyond the point of affixion, from narrow-lanceolar to broad-linear, quite entire or somewhat denticulated, the floral leaves much shortened. Headlets of flowers absolutely terminal, or some at the ends of short but seldom crowded branchlets almost axillary, comparatively small. Involucre turgid, but generally less broad than given in the illustrative plate, also less spreading and spinulous in the downward portion, often participating in the general vestiture, its constituent bracts downward much appressed, near the upper end most of them spreadingly spinular-denticulated, and except the lowest and innermost ending into a spinule of a length less than that of the whole bract. Receptacle beset with numerous capillary-setular bracts. Corollas yellow; those of the peripheral flowers somewhat enlarged and generally sterile; tube thinly filiform, rather suddenly widening, the dilated portion nearly as long as the five narrow and acutish lobes. Stamens alternate to the corolla-lobes; their filaments glabrous; the anthers shaped like a narrow elongated arrow-head, but slightly contracted at the middle. Style capillary, with circles of papillular hairlets at the upper end, otherwise almost glabrous. Stigmas semicylindric, somewhat curved, connate except at the summit. Fruit ellipsoid, moderately compressed, at the top truncated, above the narrow base unilaterally much impressed, scantily covered with almost imperceptible hairlets, shiningly greyish outside. Pappus-bristlets flattish, but

extremely narrow, scarcely subtle-ciliated, those of the outer row less than half the length of those of the inner series, but the latter still shorter than the capillary bracts of the receptacle and hardly as long as the fruit.

A closely allied species, namely *Centaurea solstitialis* (Linné), the St. Barnaby's Thistle, which is of the same geographic range in its native countries, has also already found its way into the Colony Victoria for permanent domiciliation; it remains however as yet less frequent, though in the countries at the Mediterranean Sea it seems more common than *Centaurea Melitensis*, which does neither claim British natality in the way of *Centaurea solstitialis*. The latter may be recognised already by the terminating spinules of the involueral bracts being considerably longer than the lamina of bracts, also by the outside darker colour of the fruits, with less attenuation at the base, and by the longest pappus-bristlets about doubly exceeding the length of the fruit, irrespective of some minor characteristics.

Explanation of Plate VII.

Flowering branch with its leaves, natural size.

1. Longitudinal section of a headlet of flowers, slightly enlarged.
2. Pappus-bristlets.
3. A separate corolla, unexpanded.
4. A separate corolla, expanded.
5. A corolla laid open, showing thus the stamens.
6. An anther with part of its filament.
7. Style and stigma.
8. A fruit, its pappus shed.
9. Transverse section of a fruit.
10. Embryo separated, showing cotyledon and radicle.
11. Whole pappus.
12. Inner pappus-bristlets.
- 2-7. Enlarged, but to various extent.

VIII.

KENTROPHYLLUM LANATUM.

De Candolle and Duby (from Necker), *Carthamus lanatus*, Linné.

The Saffron-Thistle.

The generic name is derived from the spinular-prickly leaves, the vernacular from the affinity to the spurious Saffron-Plant, *Carthamus tinctorius*, L.

Indigenous to Southern Europe, Northern Africa, and South-Western Asia.

Flowering under ordinary circumstances only once from the same root, but it may pass into a second year of growth. Stem strongly streaked, to about three feet high, unless exceptionally taller; its upper portion as well as the branches somewhat webby-lanuginous. Leaves stiff, bright-green, scantily lanuginous or glabrescent and slightly viscidulous papillular, prominently venular, the lowest stalked and often pinnatilobed, their end lobe much the largest; the upper leaves gradually smaller, clasping, producing short narrow spinular lobes, pungent-pointed, some of the lobes reduced to denticles. Headlets of flowers large, solitary, surrounded by floral leaves. Involucral bracts spacious, the outer upwards of leafy texture and colour, to some extent webby-lanuginous, from a broad base narrow or linear lanceolar, spinular-lobed or denticulated, the innermost narrower, nearly or quite entire and somewhat scarious. Receptacle copiously beset with setular-linear smooth bracts. Flowers numerous on each receptacle and within each involucre, uniform, unless some few of the outer sterile and devoid of a pappus. Corollas intensely yellow, more deeply so in age, towards the summit marked by dark longitudinal stripes, their tube thinly filiform, suddenly widening near the five linear lobes, its base orbicularly dilated. Filaments of the stamens near the upper end barbellate; anthers connate, sagittate-linear. Style capillary, glabrous; stigmas thinly semicylindric, except at the summit connate. Fruits seed-like, glabrous, almost semiovate, distinctly quadrangular, distinctly wrinkled, their basal attenuation somewhat oblique, outside pale or turning light-brownish. Pappus finally light-brownish, its outer scalelets very much shortened and partly truncate-bluntened, the inner gradually much longer and pointed, some exceeding twice the length of the fruit, all broadish-linear and minutely ciliolated.

Explanation of Plate VIII.

Flowering branch with its leaves, natural size.

1. Longitudinal section of a headlet of flowers, slightly enlarged.
 2. A separate corolla, showing also stigmas.
 3. A corolla laid open, the summit removed, the stamens also exhibited.
 4. A separate anther with upper part of filament.
 5. Style and stigma.
 6. Side-view of a fruit with its pappus.
 7. Top-view of a fruit with its pappus.
 8. Scalelets of pappus.
 9. Transverse section of a fruit, showing also the cotyledons.
 10. Embryo, showing cotyledons and radicle.
- 2-10. Enlarged, but to various extent.

IX.

XANTHIUM SPINOSUM, LINNÉ.

The Bathurst-Burr.

The generic name, if really indicated already by Dioskorides, is derived from a yellow pigment of this kind of plants, further from the yellow colour of the spinules. The specific name occurs first in Professor R. Morison's writings (1699). Assumed to be a native of South-Western Asia, though also thought to have originated in South-Western America. Flowering under ordinary circumstances only once from the same root. Up to some feet high, but generally more dwarfed. Branches finally almost glabrescent. Leaves on short stalks, never very large, in outline often rhomboid-lanceolar, usually three-lobed, otherwise almost or quite entire or seldom somewhat pinnatilobed, above dark-green and beset with appressed scattered short hairlets, more so along the axis and venules, beneath from a thin close vestiture greyish or whitish, the lobes acute, the terminal lobe much the longest; primary venules prominent. Spinules arising from near the base of the leaves, very conspicuous, acicular, usually ternate, but at the base connected, yellow, each representing the primary axis and the secondary of an undeveloped leaf. Flower-headlets quite small, almost or wholly unisexual; the staminate more terminal, globular, single or occasionally some few together, the pistillate usually in lower axils, all nearly sessile. Involucre of the staminate flowers consisting of very small mostly lanceolar puberulous bracts in several rows, almost free from each other; receptacle extremely short (drawn too long in the illustrative plate), individual flowers many, partly supported by solitary minute bracts; corolla beset with very short hairlets outside; lobes five, very short; tube almost obverse-conic; filaments of the stamens connate into a cylinder or separating; anthers disconnected, soon seceding, linear, curved-apiculate, finally spreading; pollen pale; style, stigmas and ovulary rudimentary or absent. Pistillate flower-headlet often solitary, soon bent downward, its involucre ellipsoid, consisting of two enlarging and bilocularly concrescent bracts, all over beset with numerous small very spreading hooked inwardly (not outwardly as drawn) yellowish or brownish spinules, open at the summit, including only two flowers, bearing a short close vestiture except at the spinules, at last hardening, often terminated by two straight spinules; corolla none or rudimentary. Stamens absent; style thinly cylindric; stigmas two, capillary-semicylindric, emerging and finally spreading. Fruits seed-like, elongated, concealed, filling the cavities, somewhat compressed, one-seeded, dark-coloured outside, glabrous, devoid of any pappus.

Explanation of Plate IX.

Flowering branch with its leaves and spinules, natural size.

1. Top view of a staminate headlet.
2. Base view of a staminate headlet.
3. A staminate flower detached, with its own bract.
4. A staminate flower laid open.
5. The five stamens separate.
6. Front and back view of anthers.
7. Style and stigmas, young.
8. Involucre and receptacle of staminate headlet, the flowers removed.
9. Fruiting involucre.
10. Transverse section of fruiting involucre, showing its two cells with seed-bearing fruits.
11. An involucreal spinule, separated.
12. Embryo, showing the cotyledons and radicle.
- 1-12. Enlarged, but to various extent.

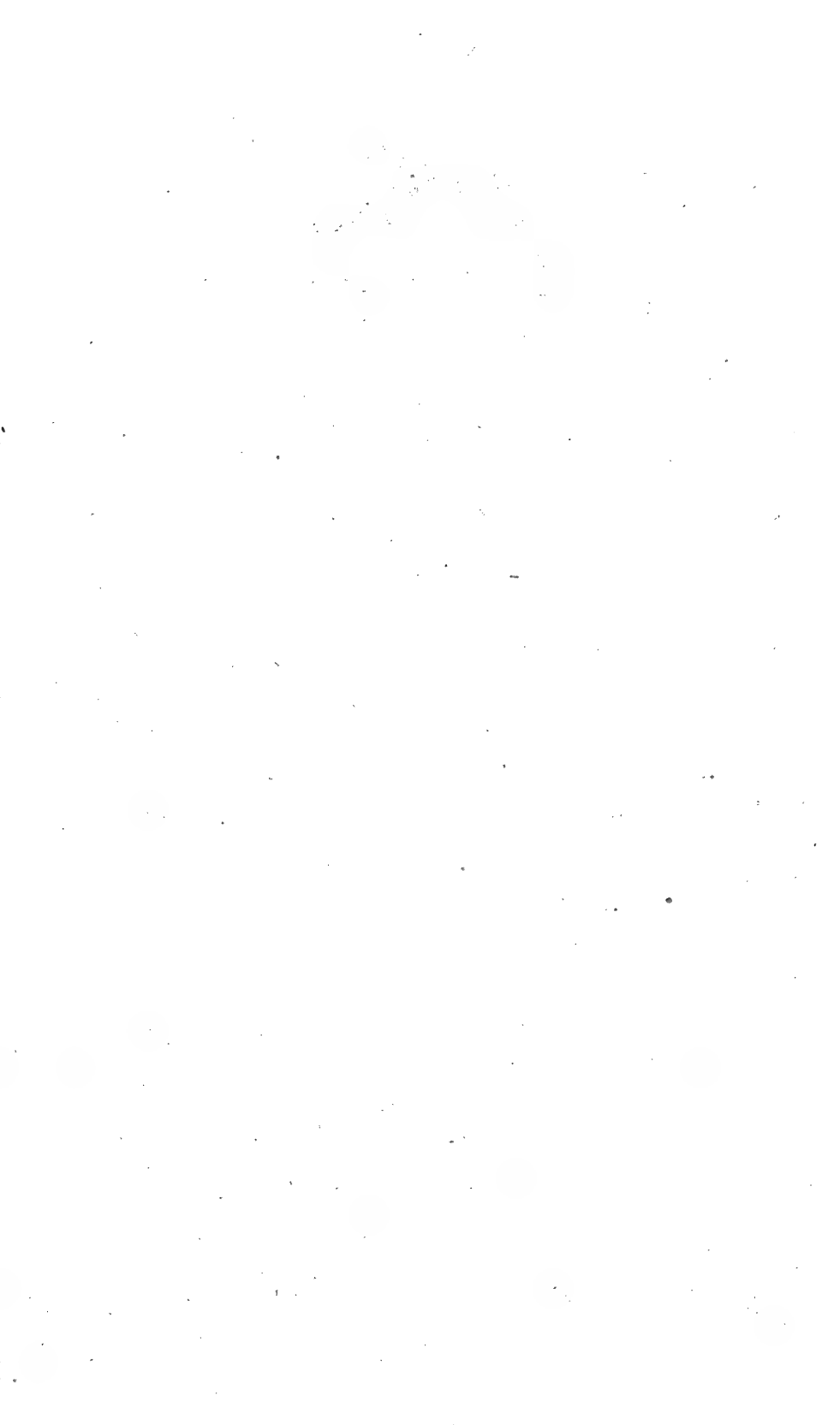


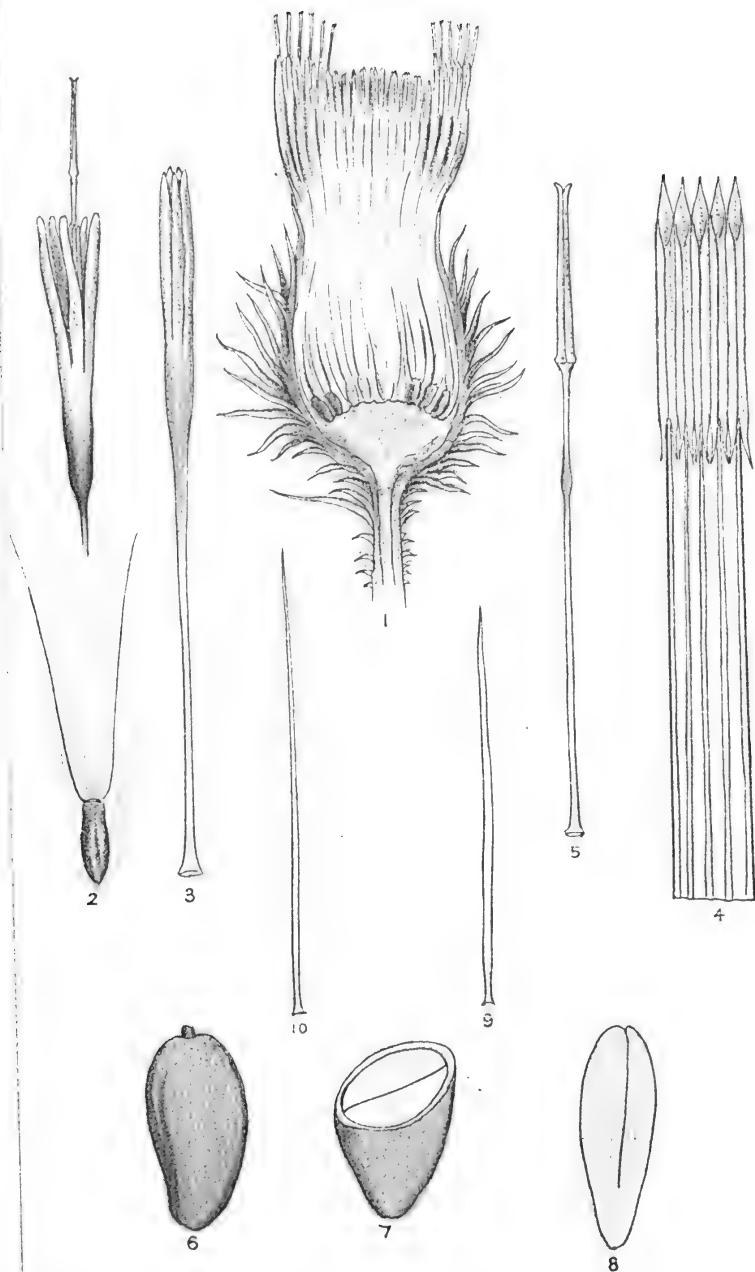
P. Ashley, Del. & Lith.

F. v. M. Dir.

Stebbing, Addy & Co. Imp.

CARDUUS LANCEOLATUS (Linné).





P. Ashley, Del. et Lith.

F. v. M. Dir.

Stebbing, Addy & Co. Imp.

CARDUUS LANCEOLATUS (*Linné*).

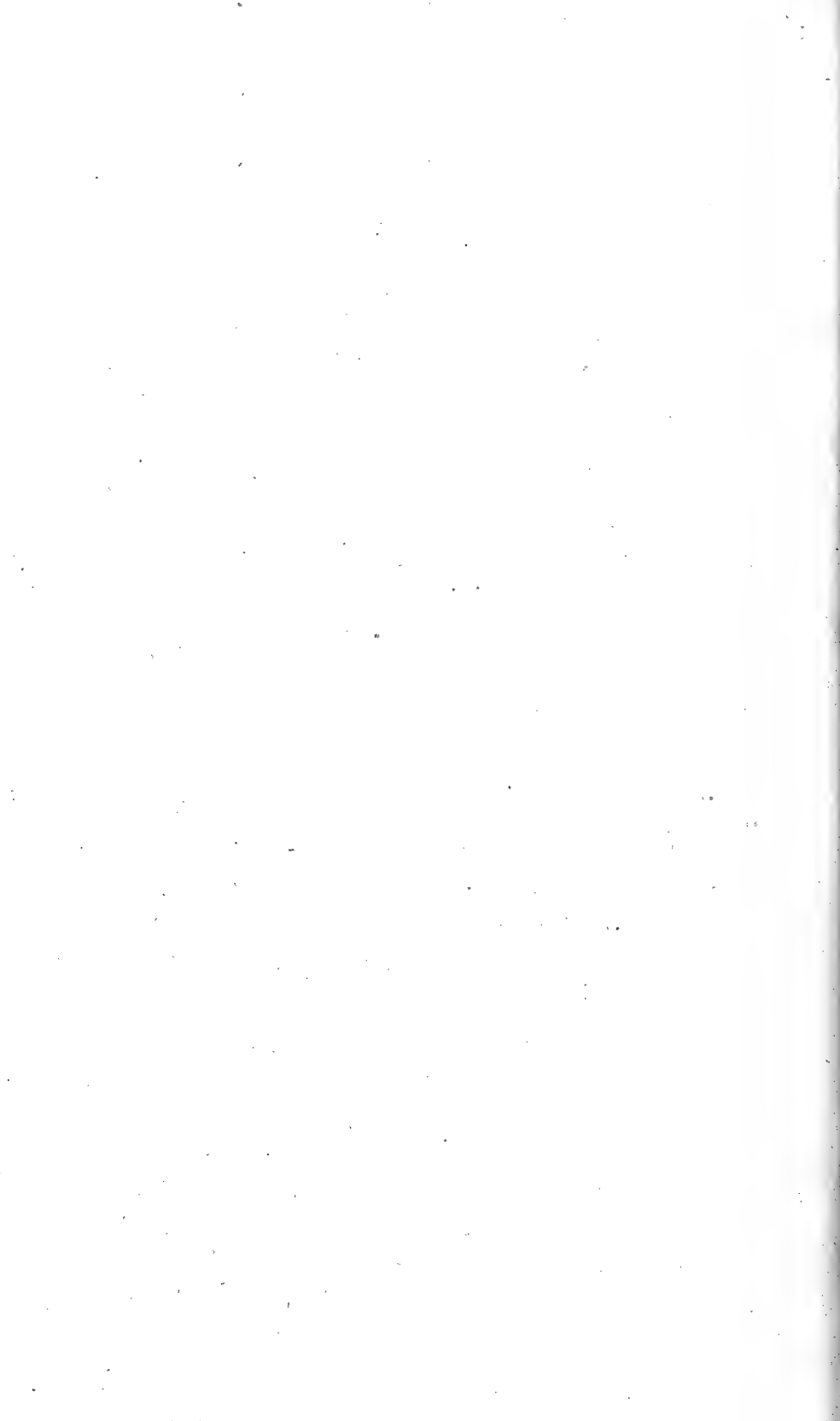


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Stebbing, Addy & Co. Imp.

CARDUUS ARVENSIS (Tabernaem).
♂





P. Ashley, Del. & Lith.

F. v. M. Dir.

Stebbing, Addy & Co Imp.

CARDUUS ARVENSIS (*Tabernaem.*)



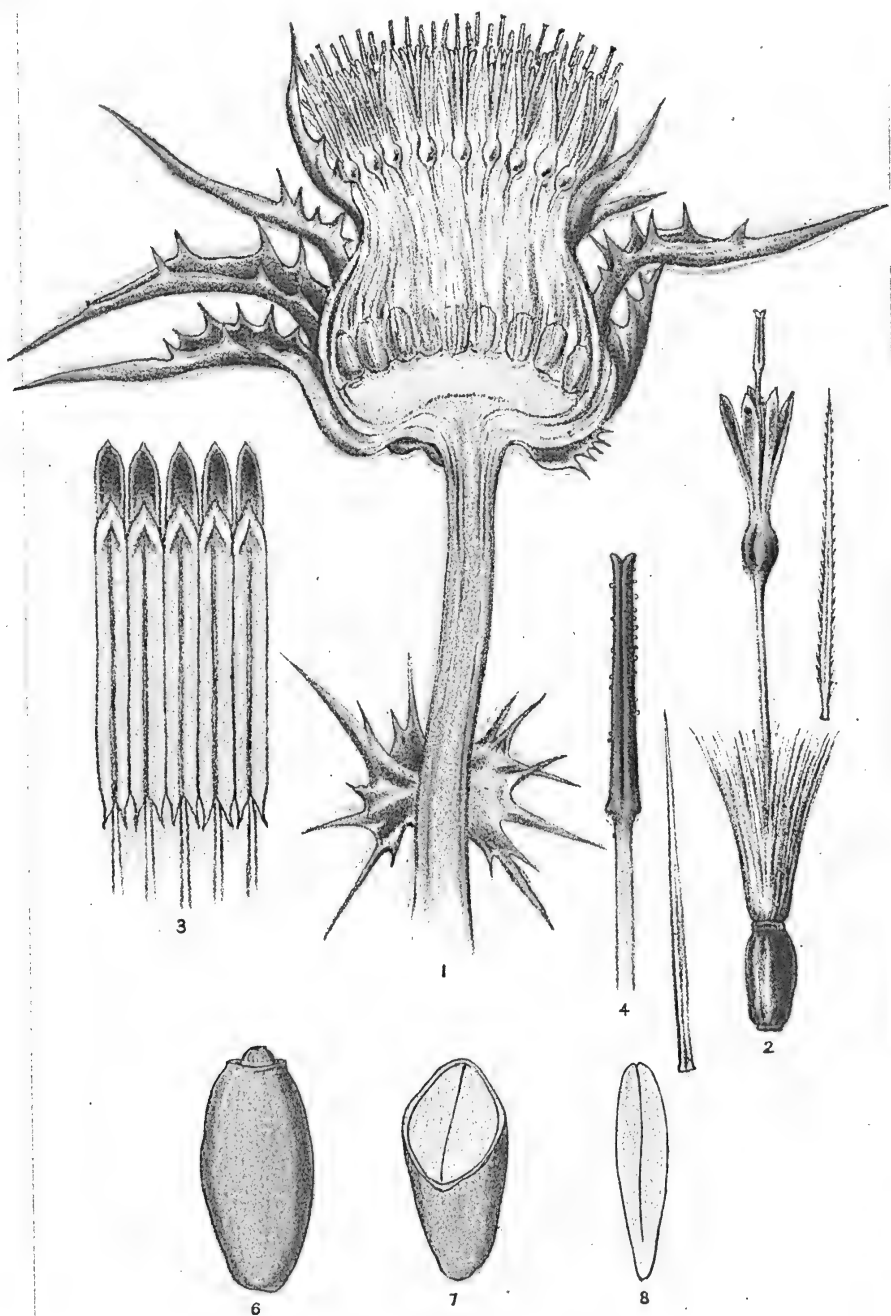


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F. v. M. Dir.

Stebbing, Addy & Co Imp^r

CARDUUS PYCNOCEPHALUS (*Jacquin*).

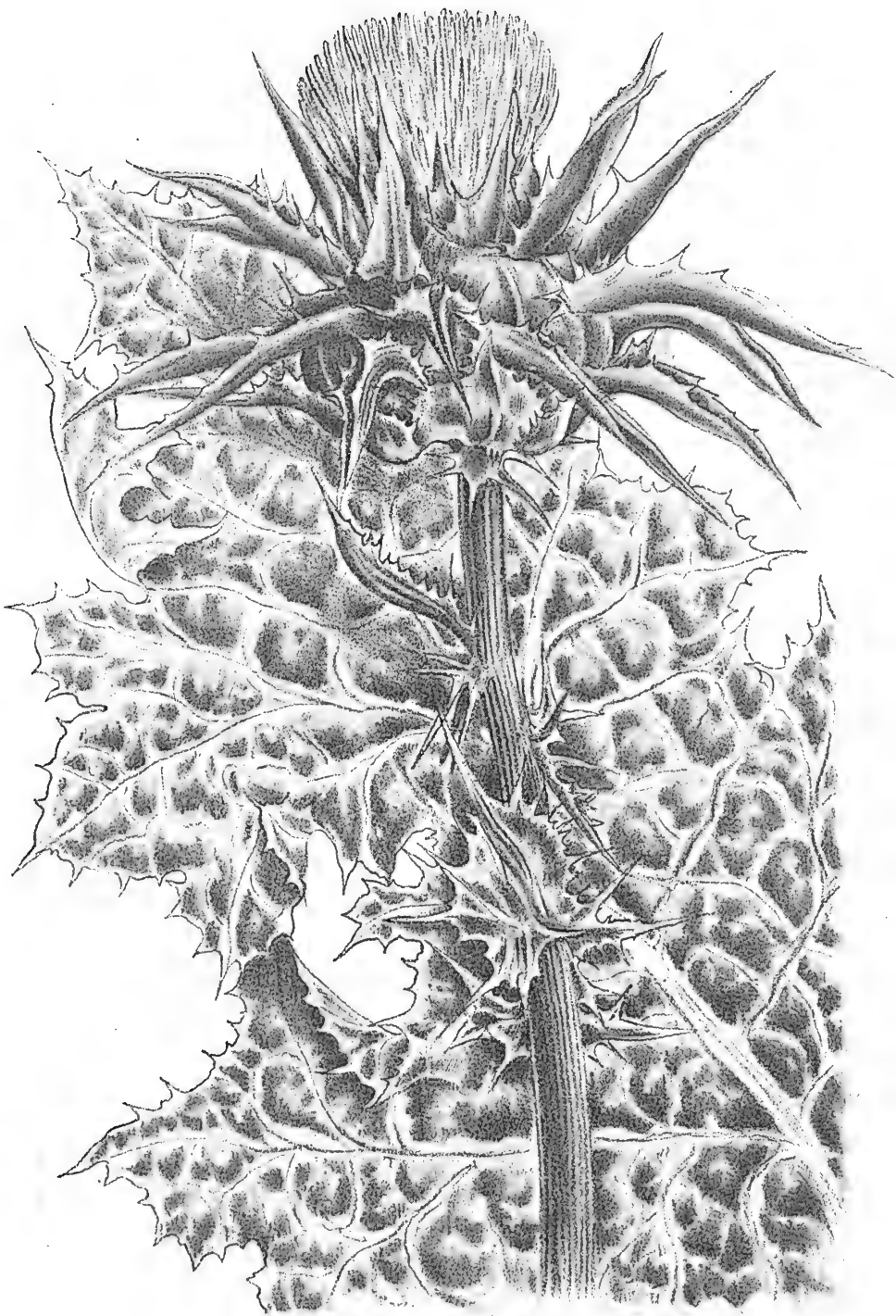


P. Ashley Del. et Lith.

F. v. M. Dir.

Stebbing, Addy & Co. Imp.

CARDUUS MARIANUS (*Linne*).

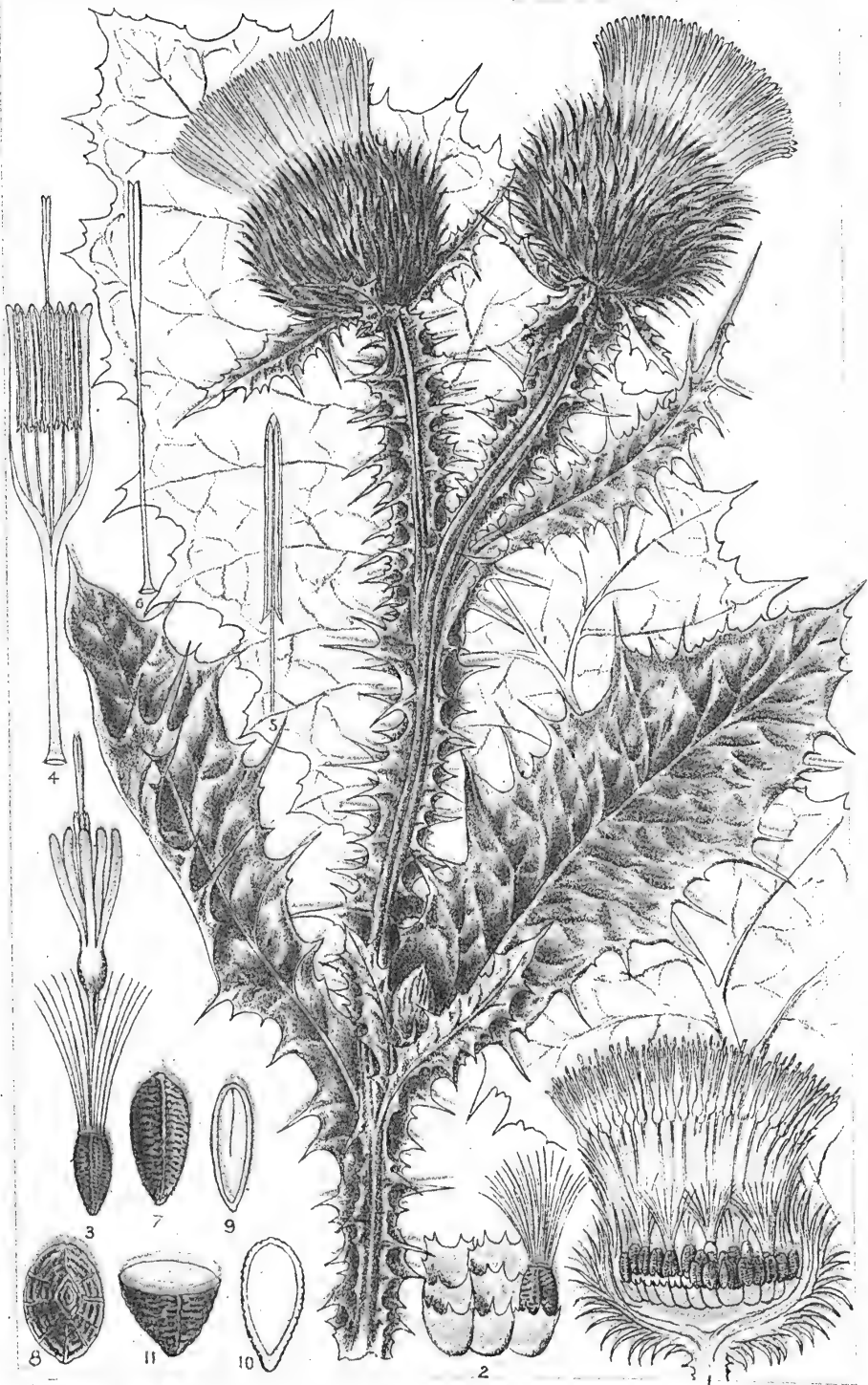


P. Ashley. Del. & Lith.

F. v. M. Dir.

Stebbing, Addy & Co. Imp.

CARDUS MARIANUS (*Linne*).



P. Ashley, Del. & Lith.

F. v. M. Dir.

Stebbing, Addy & Co. Imp.

ONOPORDON ACANTHIUM (Linne).



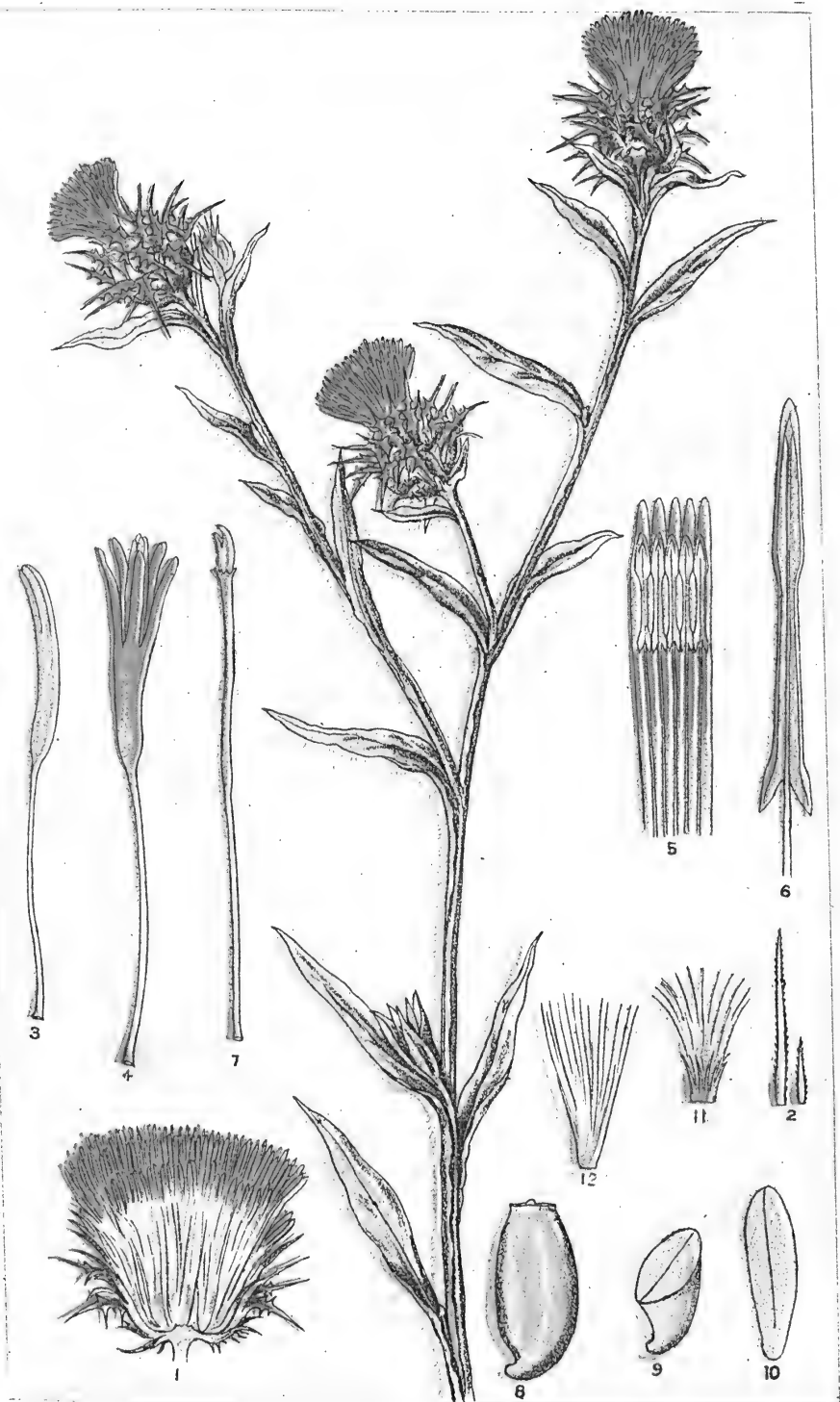
P. Ashley, Del. & Lith.

F. v. M. Dir.

Stebbing, Addy & Co. Imp.

CENTAUREA CALCITRAPA (Linneé).





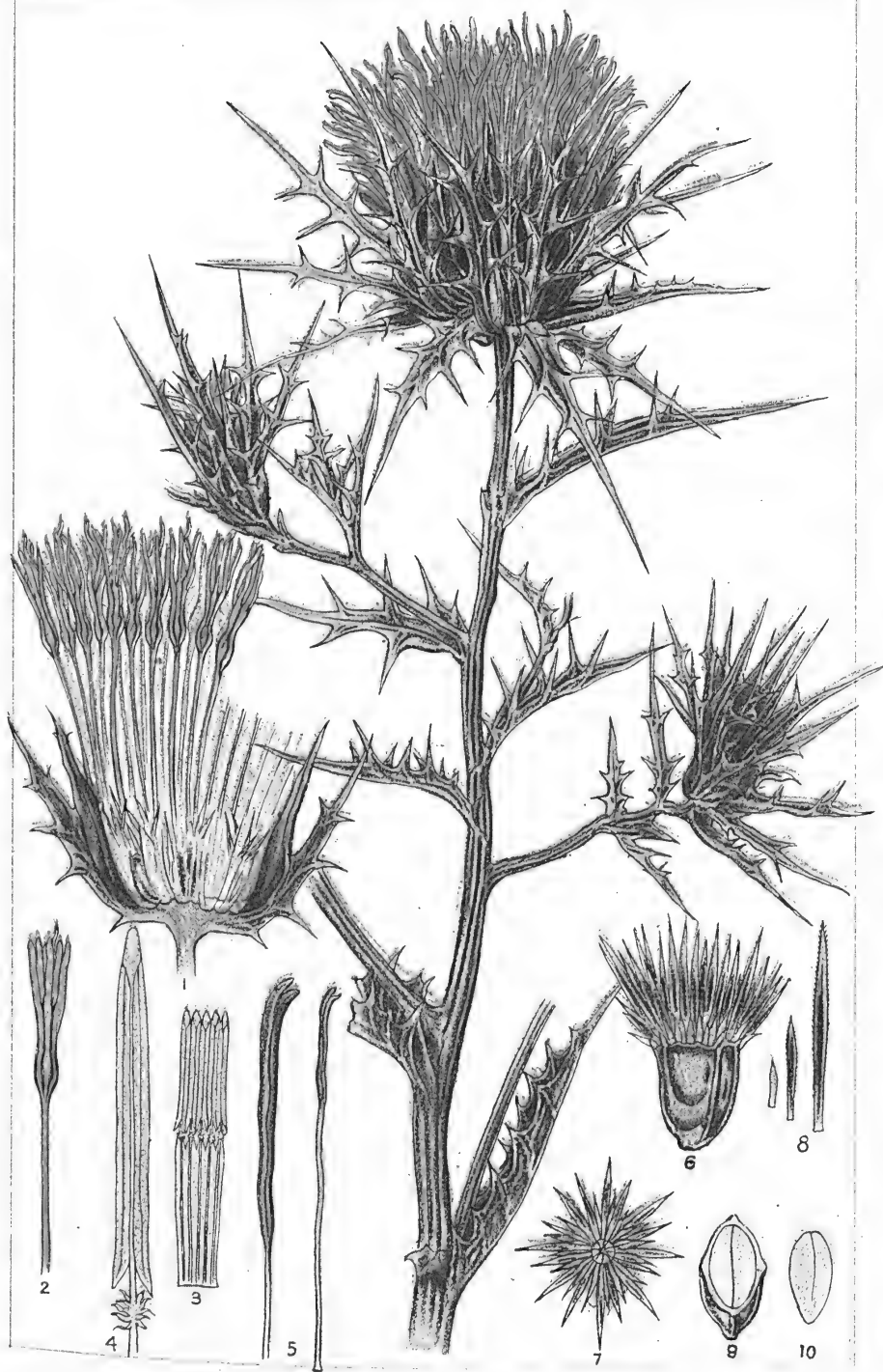
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Stebbing, Addy & Co Imp

CENTAUREA MELITENSIS (Linné).





P. Ashley, Del. & Lith.

F. v. M. Dir.

Stebbing, Addy & Co. Imp.

KENTROPHYLLUM LANATUM (Necker).





P. Ashley, Del. et Lith.

F. v. M. Dir.

Stebbing, Adair & Co. Imp.

XANTHIUM SPINOSUM (Linné).

Proclaimed plants of Victoria 2nd series

8 AUGUST, 1906.] *Potato Experimental Fields, 1905-6.*

475

FIVE-ACRE FORAGE FIELDS—SEASON 1905.

Mr. E. S. Hill, Iona.						Mr. Anderson, Digger's Rest.						Mr. Wilson, Whittlesea.						Mr. D. Syme, Mordialloc.						Average of all Sections.					
A	B	C	D	E	F	A	B	C	D	E	F	A	B	C	D	E	F	A	B	C	D	E	F	A	B	C	D	E	F
2.1	2.0	2.3	1.8	2.1	2.5	2.8	2.7	1.1	3.4	1.6	1.8	..	..	..	..	..	..	3.5	1.5	1.1	1.2	2.0	2.3	5.0	4.3	3.8	4.5	3.4	3.9
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5.4	4.3	4.8	4.5	3.4	3.9
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4.5	4.1	3.9	5.1	4.0	3.9
..	..	..	..	..	..	1.8	2.1	..	8.2	8.1	2.1	3.1	1.1	1.4	2.8	1.2	..	..	..	..	..	..	..	3.5	3.7	3.2	4.3	3.6	3.6
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4.8	4.8	3.0	4.2	3.5	3.0
..	..	..	..	..	..	1.7	2.2	1.1	2.5	1.5	1.6	8.1	4.1	2.2	2.1	2.4	9.2	8.2	1.1	3.2	2.2	3.3	7.3	3.2	6.3	3.3	3.3	3.2	5
..	..	..	..	..	..	..	..	..	..	..	..	1.4	1.9	2.1	3.1	2.2	..	..	..	..	..	..	..	4.7	4.9	4.5	5.1	3.8	4.4
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3.8	4.1	3.5	3.9	3.7	3.1
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2.2	2.2	2.5	2.8	2.3	1.5
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4.8	5.0	5.0	5.9	5.6	4.6
..	..	..	..	..	..	1.2	1.5	..	8.1	8.1	1.1	2.6	..	9.1	3.1	4.1	0.4	2.8	4.0	2.3	..	9.1	0.2	3.3	1.2	2.6	2.5	2.4	2.5
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6.2	2.2	2.6	2.2	2.5	2.3
..	..	..	..	..	..	1.5	2.0	..	6.1	6	..	1.4	..	4.1	0.6	..	2	1.5	1.7	..	8.3	..	3	6.2	2.2	2.6	2.2	2.5	2.3
..	..	..	..	..	..	..	..	..	..	..	..	6	7.1	5.1	8.1	6.6	2.3	2.3	1.5	..	7	8.1	0.2	2.0	1.9	2.4	1.9	1.9	1.9
..	..	..	..	..	..	..	..	..	..	..	..	6	9.1	2.2	1.1	1.3	6.3	4.2	6	..	7	7.1	1.1	1.6	1.9	2.0	1.4	1.8	1.7
1.3	1.0	..	9	8.1	6.1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2.3	2.0	1.7	1.8	2.2	2.3
2.5	2.2	2.6	2.0	2.4	2.7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2.5	2.2	2.0	1.9	2.0	2.5
2.1	1.7	2.6	1.7	1.8	1.1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1.5	1.6	1.6	1.6	1.5	1.1
2.4	2.7	2.2	1.9	2.0	2.7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2.8	2.7	2.5	2.6	2.4	3.0
1.7	2.2	1.8	1.7	1.9	2.5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2.8	2.9	2.3	2.9	2.5	2.8
2.2	2.6	2.0	2.4	2.5	2.2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1.8	1.7	1.2	1.4	1.3	1.2
2.2	2.8	2.4	2.0	1.9	2.0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2.0	2.1	1.5	1.2	1.0	1.2
2.1	2.3	2.4	2.8	2.4	3.0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1.8	1.4	1.5	1.7	1.3	1.6
2.5	2.3	1.6	1.7	2.6	2.3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2.1	1.4	..	9.1	0.1	4.1
3.0	2.4	2.1	2.0	2.4	2.1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2.6	1.8	1.3	1.3	1.3	1.2
1.3	1.0	1.0	7	2.5	1.2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1.4	9	..	6	5.1	4.7
2.0	2.1	1.6	2.4	2.5	2.7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1.6	1.4	1.1	1.3	1.4	1.5
3.2	2.3	2.5	2.2	2.8	2.8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2.5	1.6	1.6	1.4	1.5	1.6
2.0	2.7	2.0	3.1	2.5	2.8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2.2	2.1	1.4	2.0	1.5	1.6
1.0	2.3	2.5	2.0	2.4	2.2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2.3	2.5	2.0	1.6	1.9	1.9
2.7	2.3	2.1	2.2	2.2	3.0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2.2	1.5	1.3	1.3	1.3	1.6
2.4	1.9	2.2	2.2	2.5	3.1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2.7	2.3	1.6	1.9	1.8	2.0
2.8	2.2	1.8	2.0	2.1	2.2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2.3	2.0	1.3	1.6	1.4	1.6
2.4	2.4	2.2	2.3	2.3	2.8	1.5	1.5	..	8.2	2.2	..	..	..	..	..	..	2.9	..	..	..	..	..	..	1.9	1.8	1.6	1.6	1.7	1.7
2.6	1.9	1.6	1.3	1.7	2.6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2.2	2.1	1.6	1.3	1.7	2.6
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3.3	4.8	3.6	4.2	3.1	2.5
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3.0	3.0	2.4	2.6	3.1	2.3
1.6	..	8.1	5	9.1	5.2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1.6	8.1	5	9.1	5.2	0
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3.2	3.2	3.4	3.4	3.6	3.8
2.1	2.0	1.9	1.8	2.1	1.3	1.7	2.0	..	8.2	3.1	0.1	3	..	9.1	2.2	0.1	2.4	2.4	2.3	1.2	..	8.1	2.1	1.5	..	..	..	..	..

of Agriculture for experimental purposes.

Satisfaction, 9.3 tons; Clark's Main Crop, 9.3 tons; Bismark, 8.5 tons; Up-to-Date, 16.1 tons; Copper

INDIVIDUAL CROPS.

Some of the fields under review have shown a much more regular response to the manure dressings than the average of the whole. This may be ascribed as much to the care and attention shown as to other causes. Badly drained places in some of the plots are responsible for the irregularities of yield. In the case of Mr. Syme's field at Mordialloc—section D was on a sand ridge, which reduced the yield of that plot considerably. Mr. Anderson's field at Digger's Rest has shown the most regular response to the manurial dressings. Being on sloping land, this field has shown a profitable increase on sections E and F, and the value of the experimental work on this farm will more than compensate the owner for the labour and trouble involved. It is somewhat regrettable that many persons who undertake experimental work do not maintain the enthusiasm with which they commence. I am frequently asked to excise the unmanured section as being of no service. In my opinion, the failures, or, what is perhaps the more fitting term, non-successes are more educative than those experiments which realize to the full the hopes of the experimenter.

CONCLUSION.

The experienced reader will see in this brief review of the potato experiments one fact that will not occur to a person not directly interested, viz., that it is too much to expect such a wide range of early, medium, and late varieties of potatoes to respond in anything like the same manner to artificial manures.

It may safely be assumed that some of the varieties tried have been on unsuitable soil, and with different periods of ripening the average results from a manurial point of view are hardly comparable. Nevertheless, viewing the whole question from a stand-point that does not regard idiosyncrasies of varieties, it is patent that artificial manures intelligently used can be made to render the same assistance to the potato grower as to the grower of other crops. It may be mentioned that the experiments are being continued for three years, the rotative principle being adhered to, so that at the expiration of that term the collected information should prove of the highest value to the potato grower in every district in the State.

THE PROCLAIMED PLANTS OF VICTORIA.

(Second Series.)

*Alfred J. Ewart, D.Sc., Ph.D., F.L.S., Government Botanist; and
J. R. Tovey, Herbarium Assistant.*

Since the issue of the Thistle pamphlet in 1893, 33 names have been added to the list of plants which are required to be destroyed under the Thistle Act. The present publication consists of a series of descriptions and illustrations of these plants which was originally prepared by Mr. Tovey, and which has been revised and issued in its present form.

The descriptions are made as simple as possible, and the coloured plates should aid in rendering identification a simple matter. Mr. G. H. Adcock, F.L.S., Principal of the Viticultural College, Rutherglen, and Mr. J. W. Audas, of this branch, rendered valuable service in obtaining specimens suitable for illustration.

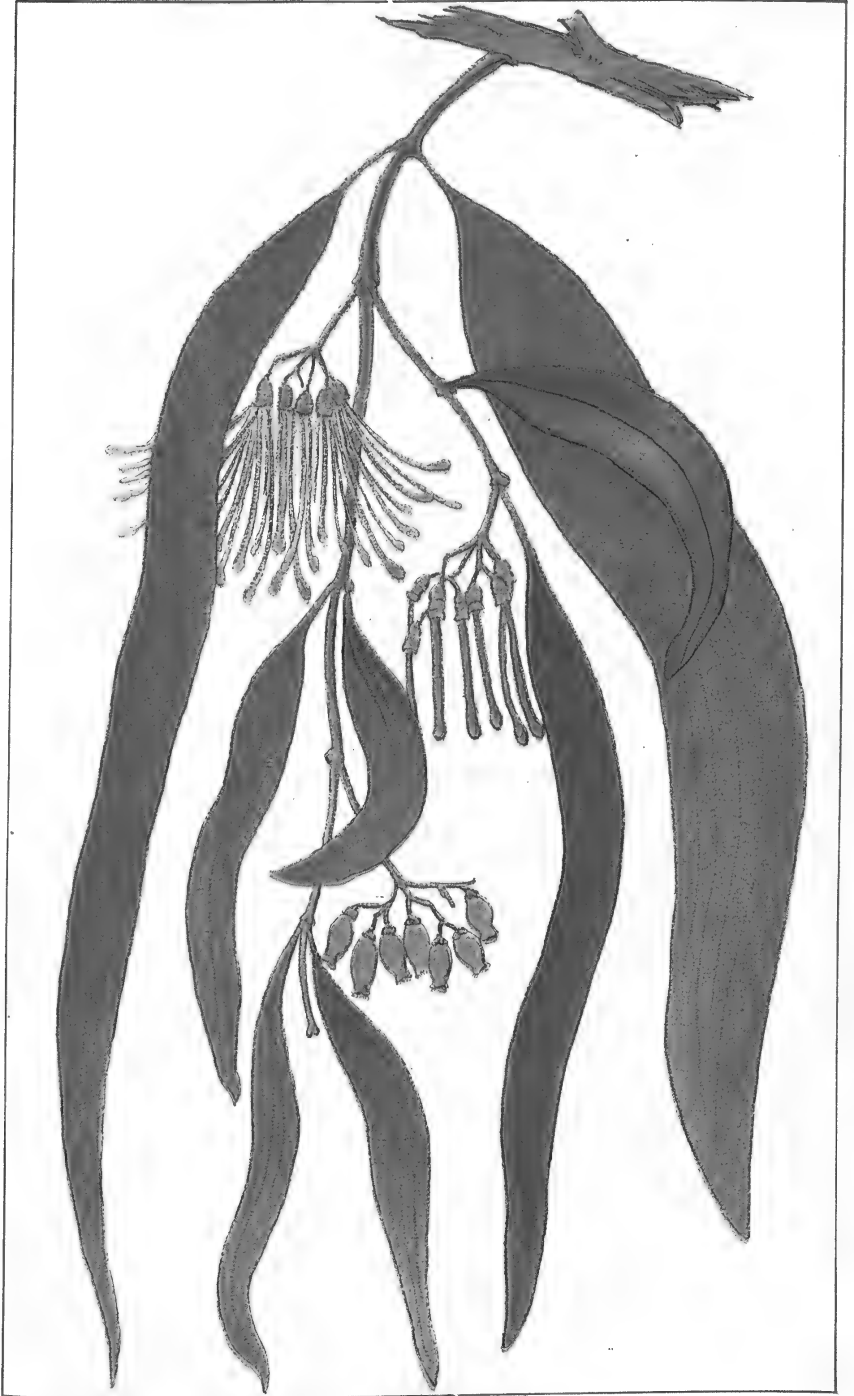


O. Wauer, Del.

J.R. Tovey, Dir. ent.

MISTLETOE.
(*Loranthus celastroides*, Sieber.)





O. Wauer, Del.

J. R. Tovey, Directo.

HANGING MISTLETOE.
(*Loranthus pendulus*, Sieber.)

Only short, safe, straightforward directions for eradication are given, since the fancy methods of weed eradication frequently advocated are less certain, are frequently dangerous, and are often as costly as the simple and thorough, but more laborious methods. Poisonous sprays such as copper sulphate may sometimes be used to keep down weeds (charlock &c.) in the seedling condition, especially if applied during dry weather, but their use is never advisable if it can be avoided, and when once a perennial is firmly rooted its destruction requires doses of poison sufficient to injuriously affect the soil and surrounding vegetation for some time. No compounds containing arsenic should be used for the poisoning of weeds on pastures or cultivated ground.

There is no doubt that many of the proclaimed weeds here described are spreading rapidly, with increasing injury to agriculture, and that this fact is due to the imperfect administration of the Thistle Act. In so far as the latter is due to ignorance, the issue and wide circulation of the accompanying descriptions and plates should remove one source of laxity, but the wide divergence in the attention paid to the Act in neighbouring shires will always militate against the permanent eradication or suppression of any particular weed. Permanent good can only be attained by simultaneous and centrally organized efforts, extending over wide areas surrounded by natural barriers to migration.

The Mistletoe.

Loranthus celastroides, Sieber. (*Loranthaceæ*.)

A parasitic glabrous shrub, on branches of trees. Leaves opposite, from a rounded egg-shape to a narrow lance-shape, and, when narrow, often sickle-shaped; thick in structure. Flowers in loose cymes, usually terminal; petals elongated, five or six, free, often yellowish or somewhat reddish, soon spreading or reflexed; loosely hung anthers. Fruit almost pear-shaped, yellowish green. The Mistletoe is a native of Australia. This parasite spreads over the trees, and eventually destroys them. It grows on gum trees, but on others also. The best method of eradication is to have the infested branches entirely removed and burned, as well as any young branches on which seedlings may have established themselves. Proclaimed under the Thistle Act for the whole State—October, 1904.

The Hanging Mistletoe.

Loranthus pendulus, Sieber. (*Loranthaceæ*.)

A glabrous shrub, parasitic on the branches of trees. Leaves mostly opposite, egg-shaped, or elongated, and of nearly equal breadth near base and apex; from 2 inches to 10 inches long, and sometimes even longer, seldom assuming a heart-shaped form. Flowers in axillary cymes; petals, usually five, elongated, soon spreading or bent back. Anthers adnate. Fruit brownish green, quite viscid (sticky); distinctly contracted at the summit. The Hanging Mistletoe is a native of Australia. Like the preceding one, this parasite is very destructive. Both, if not checked, spread over the trees and kill them, thus causing great loss in our timber resources. It is especially common on Eucalypti, but also grows on Acacias and other trees. The infested branches should be cut off and burned. Proclaimed under the Thistle Act for the whole State—October, 1904.

(*To be continued.*)

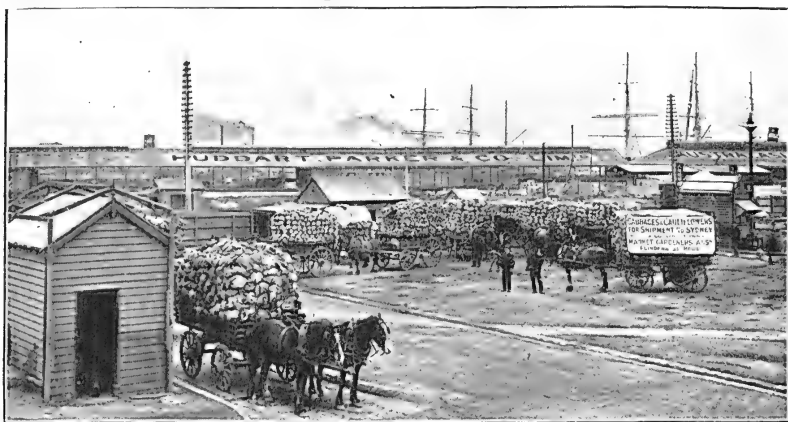
SUPPLEMENTARY LIST SHOWING RESULTS OF ANALYSES OF SAMPLES OF ARTIFICIAL MANURES COLLECTED
STATE UNDER THE PROVISIONS OF THE ARTIFICIAL MANURES ACTS 1904-5.

Sample No.	Description of Manure.	Manufacturer or Importer.	MOIST-URE.		NITROGEN.		PHOSPHORIC ACID.						Estimated Value per ton.	Where Samples obtained.		
			Found.	%	Guaran- teed.	%	Water Soluble.		Citrate Soluble.		Insoluble.				Total.	
							Found.	Guaran- teed.	Found.	Guaran- teed.	Found.	Guaran- teed.			Found.	Guaran- teed.
16345	Superphosphate, Florida	Cuming, Smith, and Coy., Melbourne	6.59	..	..	1.34	19.63	1.50	0.47	1.50	21.44	21.00	Pyramid Hill	
16495	" "	" "	3.71	..	..	1.61	17.41	1.00	4.93	2.00	23.93	20.00	Cobram	
16498	" "	" "	9.85	..	..	0.65	19.58	1.50	0.00	1.50	20.33	21.00	Nunurkah	
16500	" "	" "	11.44	..	..	1.73	18.60	1.50	0.83	1.50	21.42	21.00	Shepparton	
16501	" "	" "	9.41	..	..	1.44	19.40	1.50	0.63	1.50	21.57	21.00	"	
16505	" "	" "	9.19	..	..	1.53	19.37	1.50	0.51	1.50	21.41	21.00	Mooroopna	
16506	Superphosphate, Nitro	" "	9.46	1.06	(a) 1.00	5.55	11.26	10.01	3.88	4.98	5.48	19.37	18.6	"		
16507	" "	" "	8.89	1.06	1.00	5.86	10.59	10.01	5.86	5.31	5.48	19.37	17.10	"		
16518	" "	" "	10.23	1.02	1.00	4.67	12.97	10.01	4.67	4.13	5.48	19.37	18.1	Beaufort		
16533	" "	" "	8.00	0.83	1.00	5.93	9.94	10.01	5.93	7.00	9.48	19.37	18.1	Nagambie		
16843	" "	" "	7.80	1.18	1.00	3.03	10.52	10.01	3.03	3.88	5.48	19.37	16.1	Ararat		
16534	Bonedust and Superphosphate	" "	9.86	1.60	1.50	7.37	7.67	7.50	5.93	8.50	20.97	21.00	Nagambie			
16610	" "	" "	9.04	1.03	1.50	7.05	9.06	7.50	4.65	8.50	20.76	21.00	Euroa			
16602	Thomas Phosphate	" "	12.99	..	..	11.19	..	..	8.46	..	19.65	17.00	10.1	Benalla
16482	Superphosphate, No. 1	Mt. Lyell M. and R. Coy., Melbourne	..	..	..	2.22	19.30	18.50	..	1.00	21.52	20.75	4.5	Tullygaroopna
16503	" "	" "	12.25	..	..	2.35	18.88	18.50	1.00	1.00	22.23	20.75	4.15	Mooroopna
16511	" "	" "	11.96	..	..	2.48	19.56	18.50	0.96	1.00	23.00	20.75	4.18	Tatura
16519	" "	" "	12.65	..	..	2.24	19.13	18.50	0.67	1.00	22.06	20.75	4.15	Beaufort
16541	" "	" "	11.91	..	..	2.06	17.46	18.50	3.54	1.00	23.06	20.75	4.15	Ararat
16546	" "	" "	12.38	..	..	2.31	19.31	18.50	1.19	1.00	22.81	20.75	4.17	Rutherglen
16548	" "	" "	9.78	..	..	0.85	21.65	18.50	1.25	1.00	23.80	20.75	5.0	Springhurst
16589	" "	" "	11.81	..	..	1.28	19.32	18.50	3.08	1.00	23.98	20.75	5.0	Hamilton
16512	Superphosphate, No. 2	" "	9.84	..	..	3.65	16.20	17.00	2.56	0.75	22.41	18.50	4.10	Tatura
16513	Superphosphate, Nitro	" "	13.02	2.13	(b) 1.60	1.97	15.80	16.00	0.39	0.75	18.36	17.75	5.0	"		
16612	Bonedust and Superphosphate, No. 1	" "	11.32	1.11	(a) 1.60	1.52	17.61	13.50	3.16	4.50	22.29	21.75	5.11	Euroa		
16457	Superphosphate, Standard Brand	Renard Fertilizer Coy., Melbourne	10.51	..	..	1.40	16.70	17.00	0.50	0.50	18.60	19.00	4.1	Nathalia
16460	" "	" "	7.02	..	..	3.38	16.25	17.00	0.36	0.50	19.99	19.00	4.6	Wungah
16509	" "	" "	10.24	..	..	3.61	15.83	17.00	0.64	0.50	20.08	19.00	4.6	Tatura
16558	" "	" "	9.19	..	..	3.53	16.70	17.00	0.77	0.50	20.00	19.00	4.10	Willaura

(a) Nitrogen calculated as in bone manure.

(b) Nitrogen calculated as ammonia, 1 per cent.; as in blood manure, 1.13 per cent.

dépôt at 7 a.m. The first of the photographs gives a view of the scene outside the Government Cool Stores, taken in the early morning. On arrival at the steamer the vegetables are packed in crates, holding from



AT THE RAILWAY WEIGHBRIDGE.

fifteen to twenty dozen. This packing in crates is not required when sending per rail. Thus a saving of labour is effected, but the freight per rail is higher.

In addition to the business done in vegetables referred to, there is a big trade done with other States in bunch produce, such as turnips, carrots, parsnips, &c., as well as in peas, beans, and vegetable marrows.



LOADING INTO RAILWAY TRUCKS.

An impression prevails that the Chinese are the principal growers in this trade. The proportion of Chinese market gardeners in the State of Victoria is 44 per cent. Out of 4,622 male market gardeners, for the year 1905, 2,022 were Chinese. The great bulk of the vegetables mentioned in this article and shipped to New South Wales and Queensland are grown and despatched by Europeans, as the Chinese mostly dispose of their produce in the local markets, and sometimes by hawking.

The following figures show the volume and value of this trade for the last twelve months:—

Cauliflowers, 73,090 dozen	£14,618
Cabbages, 14,623 dozen	2,924
Bunch produce, 59,400 dozen bunches	2,228
Peas and beans, 280,000 lbs.	1,400
Marrows, 7,400 dozen	925
Total value	£22,095

THE PROCLAIMED PLANTS OF VICTORIA.

(Continued from page 477.)

Alfred J. Ewart, D.Sc., Ph.D., F.L.S., Government Botanist; and
J. R. Tovey, Herbarium Assistant.

The Stinkwort.

Inula graveolens, Desf. (*Compositæ*.)

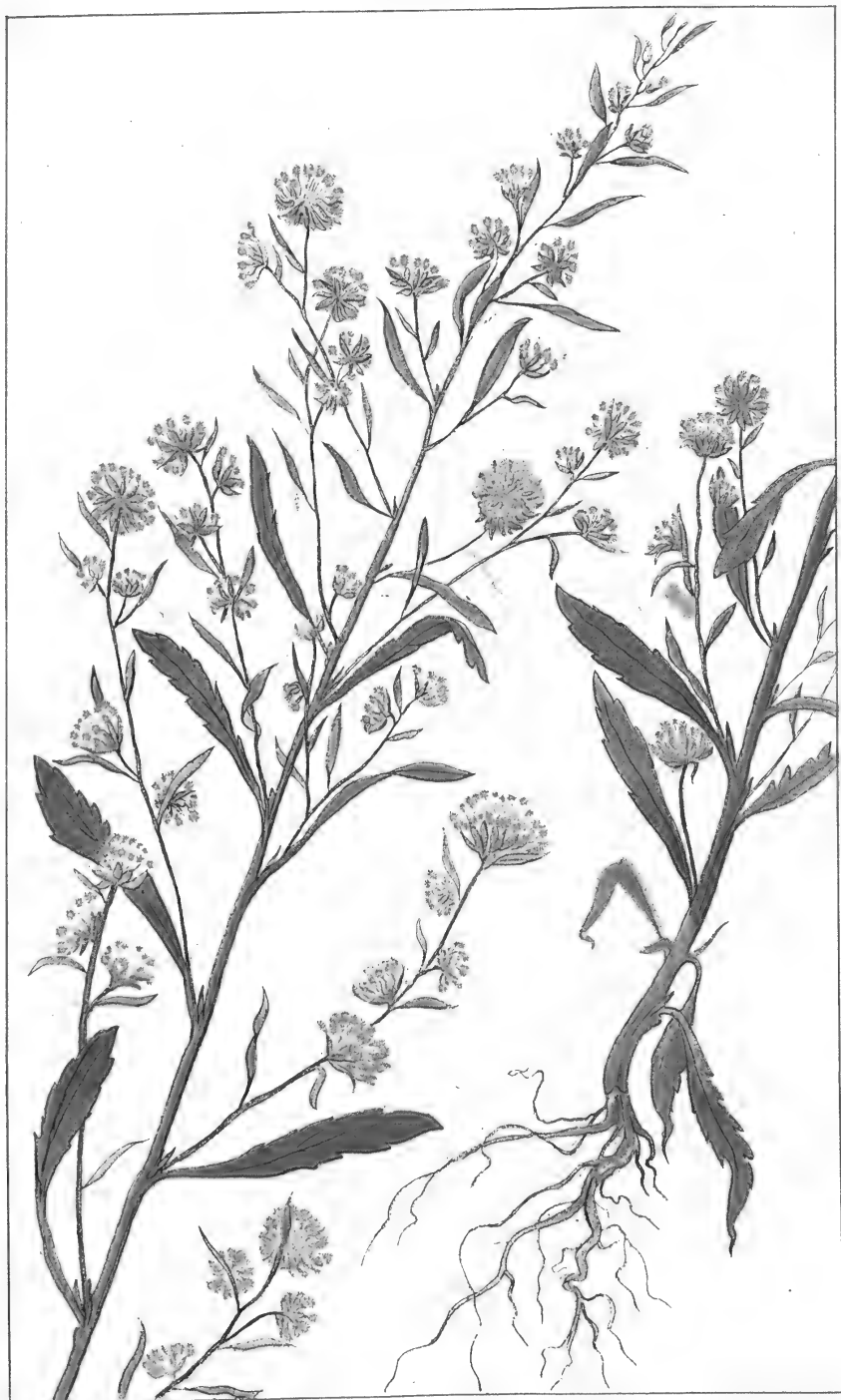
A hairy viscid (clammy or sticky) much branched, large herb, woody at the base; the lower leaves oblong, lance-shaped, imperfectly toothed; the upper leaves very narrow, and with even margins. This pest is a native of the Mediterranean regions. An alcoholic extract is prepared from the leaves, freed from essential oil, and was known to the ancient Greeks, and is still used in America for amenorrhœa. The demand is, however, exceedingly small, and is amply satisfied from local sources, so that the Stinkwort has no commercial value in this country. It should be pulled up or hoed before flowering. Proclaimed under the Thistle Act for the whole State—April, 1892.

Cape Tulip.

Homeria collina, Vent. (*Iridææ*.)

It has a swollen underground stem, $\frac{3}{4}$ to 1 inch in diameter, with thick, dark brown, latticed coats. The leaf is linear, stiff, $1\frac{1}{2}$ to 2 feet long. Stem 1 to $1\frac{1}{2}$ feet long, bearing one to four clusters of flowers; their bases are ensheathed by a membranous curled leaf, $2\frac{1}{2}$ to 3 inches long. Floral leaves bright red, with a yellow throat inside, $1\frac{1}{4}$ to $1\frac{1}{2}$ inches long. Anthers and column each $\frac{1}{4}$ inch long. Capsule club-shaped, an inch long. *Variety—miniata*. Sweet. Corm. globose, with latticed coats. Lower leaves 1 to 2 feet; linear, rigid. Stem 1 to $1\frac{1}{2}$ feet high, bearing several clusters of flowers. Spathes $1\frac{1}{2}$ to 2 inches long. Floral leaves, fulvous, with a yellow stalk, $\frac{3}{4}$ to 1 inch long, $\frac{1}{4}$ inch broad. Anthers shorter than the column. Four varieties of this plant have been described as separate species. The variety *miniata* appears to be more common in Victoria than the type form, and hence the illustration is made from this variety. The Cape Tulip is a native of South Africa. It is poisonous, and should not be allowed to spread. Apart from the abundance of seed, it is also propagated by the innumerable little bulbils (small buds or bulbs) which the plant bears. It should be carefully dug up before it seeds, and burnt with the aid of brushwood or rotted in heaps with quick-lime. Proclaimed under the Thistle Act for the whole State—December, 1895.

(To be continued.)

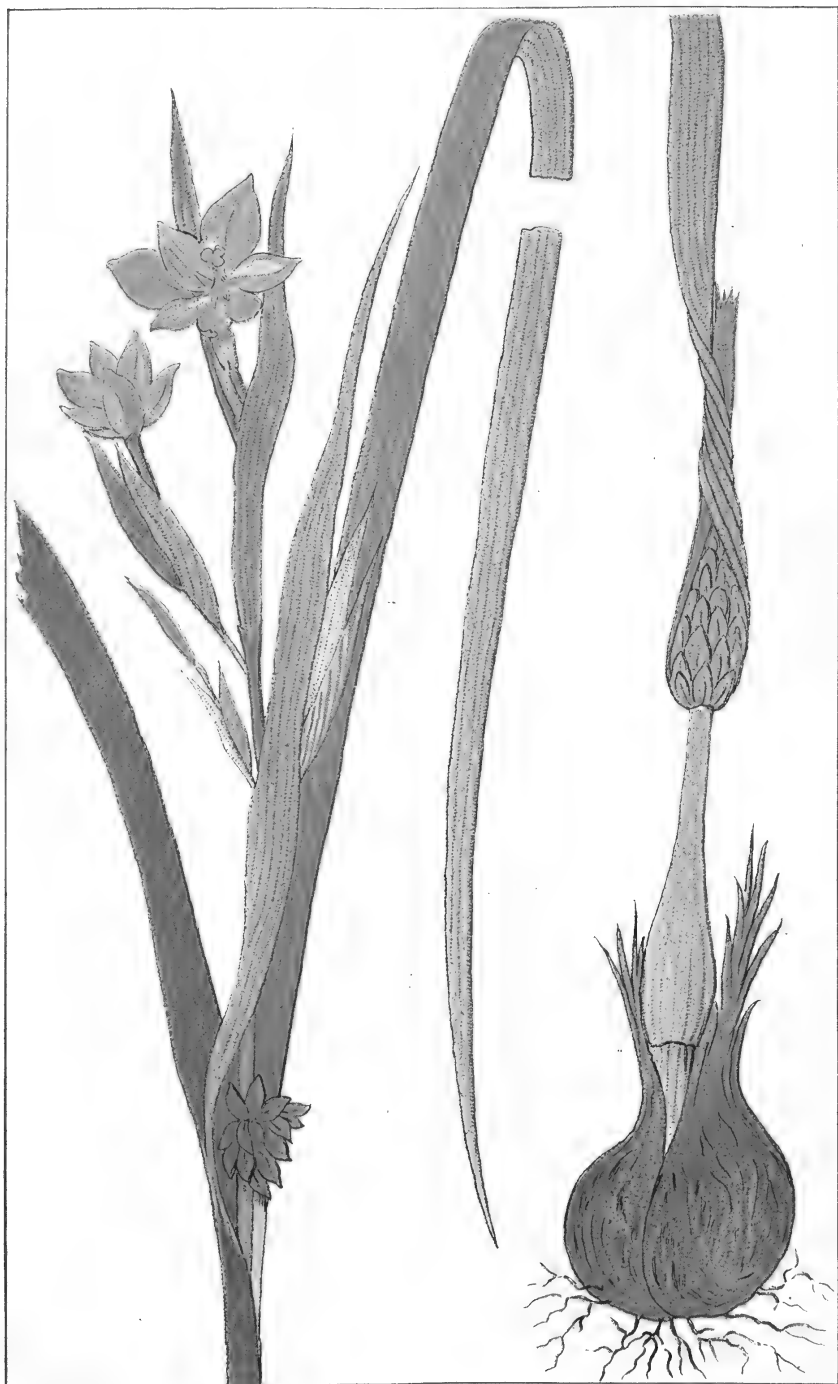


O. Wasser, Del.

J.R. Tovey, Diraxit.

STINKWORT.
(*Inula graveolens*, Desf.)

PLATE 5.



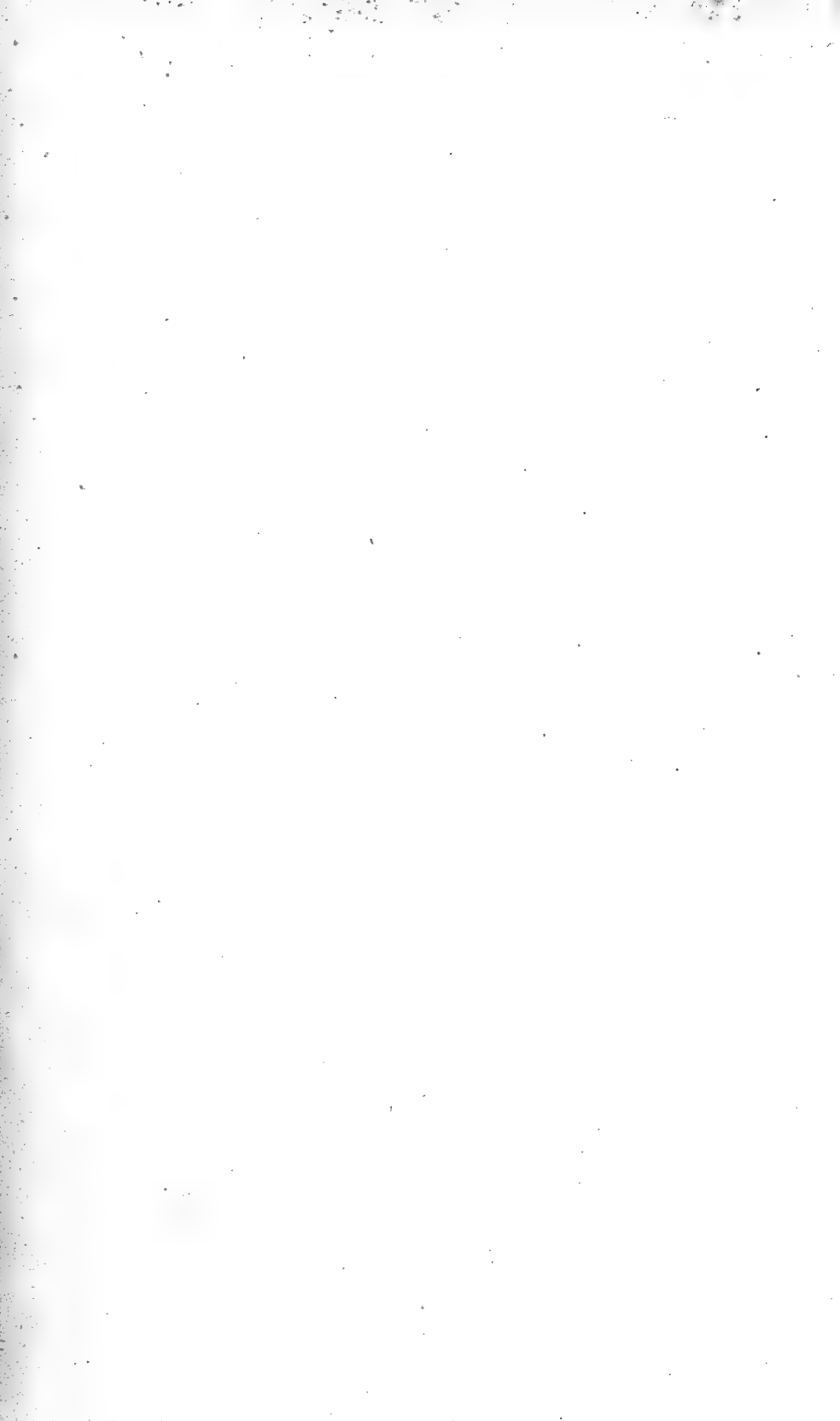
O. Wauer, Del

J. R. Tovey, Duxes

CAPE TULIP.

(*Homeria collina*, variety *miniata*, Sweet.)

VENT.



Plants of the same variety that grow a large number of leaves will often be found growing beside those that produce only a few. It is almost always best to choose the plant that grows the greater number, as by pruning off the top and bottom leaves, greater uniformity can be obtained, and a larger quantity of high-grade leaf secured. Some plants ripen more evenly than others. That is, the leaves all ripen together. This is an advantage, as the cure and sample will be better. Early maturing plants save labour and risk, the differences being very marked. Some plants will ripen in from twelve to sixteen weeks, others taking as long as twenty-two weeks; that is, from the time of transplanting. The saving of a month's work in the field is well worth trying for, while the risk of loss from frost, hail, wind, &c., is minimized. Quickly grown tobacco is always best. Plants that grow the leaves without a frill, or lug, round the stalk or butt of the leaf are more easily suckered and stripped than those that do, and there is less cover for grubs, moths, and thistledown. A fair distance between the leaves on the stalk also makes easier working. Where the leaves are well apart, a good cure is more easily effected, as they are not so bunched together in the shed.

It is not wise to save seed for general purposes from plants that have not been acclimatized, but when a variety has been grown for two years, and has proved suited to soil and climate, seed can be taken. It is important that a healthy season be chosen in which to save a large quantity of seed. If the disease known as Blue Mould has been prevalent in any one season, it is better not to save seed unless necessary. The same remark applies to other diseases, though, fortunately, we in Australia are free from many diseases of tobacco which occur in other parts of the world. One healthy tobacco plant will, if properly treated, provide sufficient seed for the planting of from 25 to 50 acres; consequently, it is not necessary to preserve a large number of plants for the grower's own use. At the same time, when in a good season a number of particularly good plants are available, an extra quantity of seed should be saved: sufficient for seven or eight years' supply is not too much. Heavy seed is better than light, and, for this reason, it is a good plan to sift the seed through a very small sieve made for the purpose. Another method is to blow the light seed away by means of a fan, regulated so as not to be too powerful. Threshing is easily accomplished by rubbing the pods when dry between the hands. After shelling the seed into a dish, it should be sifted, and then placed in jars made air-tight with screw tops, and carefully labelled with the date, name, and characteristics. If stored in a dry situation it will retain vitality for ten years.

To secure the best plants for seed, it is a good custom to save considerably more plants until near the ripening stage, than are ultimately intended to keep. By that time it can be decided which are most true to type, mature early, are uniform, easy to handle, and healthy. Then be sure to try for the smaller quantity of strong, healthy seed by taking off all the top leaves, suckers, and branches. Leave only the central cluster of seed pods, and protect from outside contamination. If every grower would undertake the selection of his own tobacco seed under proper methods, a great improvement in Victorian tobacco leaf would surely result. The time and labour necessary to do this would be very little. It is only natural to presume tobacco can be improved in quality, quantity, and value; just as maize, wheat, and potatoes have benefited by the same attention, more especially as it has been proved that individual tobacco plants are most consistent in handing down their special characteristics.

THE PROCLAIMED PLANTS OF VICTORIA.

(Continued from page 558.)

Alfred J. Ewart, D.Sc., Ph.D., F.L.S., Government Botanist; and
J. R. Tovey, Herbarium Assistant.

The Water Hyacinth.

Eichhornia speciosa Kunth; syn. *Pontederia crassipes*, Mart.
(*Pontederiaceæ*.)

A floating plant, the roots having a cap-like covering at the extremity. Stems very short, the leaves almost entirely immersed, roundish, but very variable in shape; leaf-stalks, long or short, more or less inflated below the middle, with a sheathing scale at the base. Flowering axis from 6 to 12 inches long, with several sheathing bracts. Flowers, 6 to 12, with a curved tube, pale-purple; the five lower segments nearly equal, the upper one larger, and marked with a yellow spot in a cloud of blue. Stamens inserted within the tube, 3 long, 3 short, filaments lilac, with numerous stalked glands. Anthers oblong; ovary tapering upwards into the style, stigma globular. It is a native of tropical South America. The flowers are very beautiful, and, as it flowers freely, it has been widely cultivated.

The following extract from Bulletin No. 14 (1891), issued by the U.S.A. Department of Agriculture, plainly shows the danger of allowing this plant to spread:—"Along the St. John's River the margins are lined on each side by a broad belt of plants, and all coves, marshes, and small tributary creeks are entirely covered. Sometimes the main channel of the river becomes blocked by masses of the plant. The same conditions also prevail in Florida and other districts." Proclaimed under the Thistle Act for the whole State.—October, 1901.

(To be continued.)

THE WEEDS OF LAKE WENDOUREE.

Alfred J. Ewart, D.Sc., Ph.D., F.L.S., Government Botanist and
Professor of Botany in the University of Melbourne.

Great difficulty has been experienced by the Ballarat Council in keeping the luxuriant growth of the weeds of Lake Wendouree in check, and considerable expense has been incurred by them for this purpose. Numerous abortive attempts have been made in the past to permanently clear the lake, and much money spent, without achieving any permanent improvement. Recently the Council imported a fen reed-cutter from Bedford. This is a small stern-wheel paddle-boat driven by a petrol motor, and trailing on each side an iron rod, which can be raised and lowered. At the end of the rods, a pair of strong cutting blades is fixed so as to form a V with the apex forwards. The cutting edge of each blade is like that of a bread-saw, and the knives are drawn after the boat in a series of jerks by the aid of a crank attachment to the connecting rod, the knives being kept a few inches off the bottom. The cutting goes on during six months of the summer, and at such times and in such places as to insure that the cut

PLATE 6



WATER HYACINTH

Eichhornia crassipes, Kunth
Pontederia peruviana, Mart.



weeds, which mostly float at the surface, will be driven to the side by the wind, so that they can be drawn ashore. In this way a certain amount of the area has been kept reasonably free of weeds during the past year, but only by a total expenditure of approximately £400 per annum, in which no allowance is made for the time of officials taken from other work.

At the request of the Council, a visit of inspection was made in August, 1906, to determine whether any means could be devised of keeping under the weeds at small cost. The more troublesome weeds growing in the lake are all flowering plants, of which specimens of the following were obtained. Only one specimen (*Myriophyllum elatinoides*) was found in flower, so that the naming is in certain cases subject to revision.

FLOWERING PLANTS.

Myriophyllum elatinoides Gaud.—Long stems, feathery leaves, spikes of minute flowers with entire small but broad leaves projecting above the water. This plant is easily kept under by cutting, and frequent cutting will ultimately practically suppress it.

Potamogeton obtusifolius Mert and Koch.—Grass-like plant, with slender creeping stems, and erect ones with long, rather narrow, thin leaves. After cutting the erect stem, the remaining basal portions, which contain a good deal of stored food, shoot at every joint, and in summer time very rapidly increase to the original size, and may even be denser than before. It can be kept under by dredging or raking off the bottom. This plant was first noticed in quantity in 1904, four years after the waste water from the reservoir was turned in, and since then has spread rapidly. Specimens of the plant were, however, sent to the National Herbarium from Lake Wendouree by Spence, in 1883. *Potamogeton natans* has oval leaves floating on the surface.

Lepilaena Preissii F. v. M. — A somewhat grass-like plant, which can be kept under by dredging or by raking mud over it. This plant and another more grass-like one appear to be diminishing. The latter plant resembles in vegetative characters *Ruppia maritima*, although it seems hardly likely to find this maritime plant so far inland in a fresh water lake, even if the water of the lake had been brackish before the supply of fresh water was increased.

Triglochin procera R. Br.—A large plant with rather lily-like leaves. A large quantity of food is stored up in the stem and roots, buried in the mud, so that frequent cutting is required before the plant is exhausted.

Vallisneria spiralis L.—In leaf this plant slightly resembles the former one, but the leaf is thinner, a darker green, less rigid, and does not project above the water, while the female flowers are on long spirally-coiled stalks. Frequent cutting soon exhausts the plant.

Villarsia reniformis R. Br.—Floating, more or less kidney-shaped leaves on long stalks. Easily kept under by cutting.

Typha angustifolia L. Reed Mace.—One of the largest of the reeds, all of which can be kept under by frequent cutting as close to the base as possible. It is worthy of note that in the fen districts of England reed-cutting is a profitable industry.

The non-flowering plants included *Azolla* (floating on the surface), *Spirogyra* (floating beneath the surface), and *Nitella* (growing from the bottom). The former plant takes the place of the Duckweed (*Lemna*) of an English pond, and is easily removed when driven to one side by the wind. The two latter plants are very sensitive to poisons. Thus, the

addition in summer time of 10 tons of crude sulphate of copper, at a cost of rather more than £150, would kill out these plants without affecting the other living organisms to any appreciable extent; but they are, unfortunately, the least troublesome weeds of all.

The fish of the lake are mainly carp and trout. They are stated to be abundant, but the weeds render fishing difficult. The lake appeared to be remarkably deficient in fresh water snails. These, when abundant, aid in keeping down the weeds, but are hardly likely to be of much service under the present conditions. It might, however, be worth while to introduce such large forms as *Paludina vivipara*, if not already present.

Points of great importance are the fluctuations of level, the amount and character of the water supply, the nature of the bottom, and whether the water is put to any use or not. In regard to the last-named item, the lake is held by the Council under a Crown grant, one condition of which is that the lake is to be kept in such a condition as to be available for temporary domestic supply to Ballarat city. The use of the water of the lake in summer time, with the bottom in its present condition, would be fraught with the utmost danger to health. At present, however, the overflow is put to no use, nor is any water drawn from the lake for domestic or other purposes.

The lake is fed partly from surface drainage and partly from the overflow from the waterworks. A sample of the latter (August 6, 1906) was very clear, left no appreciable residue on filtering, and contained 0.091 of a gram of dissolved solids per litre, including a little lime. The surface drainage water was slightly turbid, left a very slight residue on filtering, and contained 0.25 of a gram of dissolved solids per litre, in which hardly any lime was present. The clear surface water from Lake Wendouree left no residue on filtering, and contained 0.28 of a gram of dissolved solids, of which lime formed a greater part than in either of the other two residues. Since this is at a time when evaporation is reduced to a minimum, and when the overflow is greater than the inflow from the waterworks, it is evident that the water in the lake dissolves soluble constituents, partly lime, from its bed. Possibly lime may have been added at some past time, but it is evident that there is no hope of reducing the weeds by mineral starvation, by allowing only the purest water to enter the lake.

The bottom of the lake is composed of rock and boulders, covered by 3 to 8 inches or more of black mud. In the past several deep quarry-holes, up to 17 feet in depth, were excavated. These were naturally free from weeds, but are being filled up, and will soon be as subject to the spread of weeds as the rest of the lake. The denser black mud contained 18 to 21 per cent. of organic matter (dry weights), while the percentage in the soft, rich ooze ran up to as much as 45 per cent. A bottom of this character is favorable to weeds, and unfavorable to good fishing.

Another factor favouring the weeds is the maintenance of a more constant level since 1900, when the Gong-gong pipe was first turned into the lake. Before that the level often sank to 1 ft. 6 in. or less, whereas since then the summer depth is rarely less than 3 feet. In this way the natural check formerly imposed by the partial drying up of the lake in summer has been removed to a very large extent. From September, 1903, to December, 1904, the level of the lake never fell below 4 ft. 6 in. deep, and it was precisely at this time that the *Potamogeton* first became so troublesome. The rapidity with which evaporation can lower the level of the lake is shown by the fact that during January and February, 1906,

the level fell nearly $\frac{1}{4}$ inch daily, the total loss of water being 170,000,000 gallons, or rather more than the total overflow per annum.

THE PROBLEM OF WEED-SUPPRESSION.

The introduction of various animals, by restoring the balance of nature is often of service, but would be of little or no use here. Ducks and similar water fowl aid in several ways in keeping under certain water weeds, but at the same time by their devouring water snails and herbivorous larvæ, this effect is largely neutralized.

The cutting machine will keep under, or even suppress by frequent cutting, all those weeds which project to any extent above the water, but is very much less effective in the case of those which grow completely submerged, and these are precisely the weeds which are most troublesome at present. Cutting such forms acts in precisely the same way as mowing a lawn—the herbage becomes shorter, but thicker and closer.

Poisons.—The use of any such poisons as copper, mercurial, or arsenical salts, while extremely costly, would also involve the danger of so poisoning the lake by precipitation and surface adsorption that it might become incapable of supporting fish for some years. A method of treatment which would avoid this danger would be to allow the level of the lake to fall as low as possible, net and transfer the larger fish to a pond, and then acidify the water with sulphuric acid, followed a month or so afterwards by the addition of lime. This treatment would, however, make the lake extremely offensive for several months, the treatment would need repeating within three or four years, and would be costly. Thus sulphuric acid is fatal to water-plants in a concentration (by weight) of 0.05 per cent., which is approximately equivalent to one gallon of commercial sulphuric acid, at 2s. per gallon, in 3,000 gallons of water. At a depth of 2 ft. 6 in. the lake would contain approximately 300,000,000 gallons, and to poison this efficiently 100,000 gallons, or £10,000 worth, of sulphuric acid alone would be needed. Methods of poisoning are, in fact, out of the question, since, owing to the large number of weeds in the lake, their varied properties, and the fact that their absorbent surfaces are covered with water, only a general treatment of the above character would be of any avail, and special local treatment would be useless.

Cleansing and deepening form the only ways in which any practical permanent good can be effected. With a clean bottom and deeper water, no trouble would be experienced from weeds. If the lake were allowed to dry in summer time, and a paring plough run over it 4 to 6 inches deep, this surface material would contain all the rooted plants. Its removal would leave the bottom fairly clean, and the material could be used for raising the borders of the lake or for filling purposes elsewhere. Taking the area of the lake as $2\frac{1}{2}$ million square yards, the quantity of material to be removed would be 300,000 cubic yards, and the cost might be £10,000 or £15,000. This seems a prohibitive outlay, and would further involve the disuse of the lake for a year. It must, however, be remembered that the present outlay of £400 per annum represents, at 4 per cent., a capital sum of £10,000, and that in the past over £700 per annum has been spent in suppressing the weeds without achieving any permanent good.

A modified form of treatment which could be spread over a longer period of time, and would not involve the disuse of the lake during operations, would be as follows:—Around the edges of the lake horizontal

dredging might be carried out by means of an arrangement resembling a harvest gleaner, but with the teeth close together, and curved from side to side so as to retain the mud and weed. This could be drawn ashore by a wire rope wound by a traction engine, the dredge starting near the shore, and being carried further and further out by the steamer at each cast, until a distance of 50 to 100 yards was reached. The mud at the edge of the foreshore, when dried and faced with gravel, would form a natural embankment, raising the level of the lake. If the surface drainage from the upper end could be cut off from the lake and drained the other way, the raising of the lake level would not cause any flooding through the present drainage inlets, and the lake would gain by the purer water supply from the reservoir overflow, which is apparently sufficient to fill the lake to its highest level during winter time.

The beauty of the lake might be considerably increased by forming a couple of islands at its centre to take over the protective functions of the existing reed belt, and the material for the islands could be gained by deepening the bottom of the lake. The outline of the island would be formed by a row of piles, about 3 feet apart, and rising a foot above the high-water level. Within these a second slender row would be needed, leaving a space of about 18 inches. This would be filled with fascines of reeds, each containing a 10 to 20-lb. ball of clay or stiff mud. The soft mud and ooze obtained by dredging or pumped into this framework would soon consolidate under the pressure above if the level were kept a foot or so above high-water mark, and ultimately ornamental trees could be planted upon it.

The details and cost of carrying out these suggestions would naturally need to be determined by an engineer, but they afford the only practicable means of effecting any permanent improvement to the lake at a reasonable cost—that is, by cleaning the bottom and increasing the depth. It should be borne in mind that the existing reed-belt in the centre of the lake represents a continual source of infection as regards weeds for the rest of the lake, and that cutting the weeds without drawing them ashore increases the fouling of the bottom.

SEED STANDARDS OF PURITY AND GERMINATION.

F. E. Lee, Agricultural Superintendent.

A not infrequent inquiry made by the farmer is, "Where can I purchase reliable seed?" It is in no sense the duty of the Department of Agriculture to recommend any particular seed merchant, hence a few simple rules for the determination of the purity and vitality of seeds may be of service to persons wishing to make tests for themselves.

There are three characteristics which distinguish good seed from bad, viz.: purity or freedom from foreign matter, vitality or capacity for germinating under favorable conditions, genuineness or trueness to name and type. In order to obtain a representative sample, it will be necessary to take a small portion from at least one-third of the number of

as Ponderosa, set their fruit better when trained on a trellis at sharp angles from the upright; tied to stakes, or trained perpendicularly, they grow too vigorously to fruit well. Shy bearers are also stopped occasionally at a joint above the one carrying the flowers, the check causing the fruit to set. Should the larvæ of the tomato moth attack the plants, they should be sprayed with a solution of Paris green, at the rate of 1 ounce to 12 gallons water; milk of 1 pound fresh lime should be added, and the mixture kept thoroughly agitated while being applied.

Seeds may be sown for a succession of various saladings, peas, beans, &c. Plantings may be made from former sowings, choosing a dull day, if possible, for the purpose.

THE RASPBERRY.

James Lang, Harcourt.

The raspberry is essentially a cool climate fruit, and will only succeed in those districts which have a considerable elevation and a moist climate. The Dandenong Ranges and the ranges around Kinglake is the ideal home of the raspberry. It succeeds best on a deep loamy soil, and will also do well on alluvial soil of good depth; soil of a dry, sandy nature is the least desirable. Raspberries bring in a small return the first year of planting, and are therefore very suitable for small growers, who must have a return for the labour and capital expended as soon as possible. When choosing a situation for a raspberry plantation, see that it is sheltered as much as possible from hot winds, which sometimes cause great loss to the grower in a hot dry spring.

PREPARING THE LAND.

In preparing land for planting, it should be deeply ploughed to a depth of at least 8 inches, and allowed to lie fallow till the autumn. During the summer the ground should be stirred occasionally with the scarifier to destroy the weeds as they appear, and about the beginning of April the ground should be again ploughed and harrowed down level; it is then fit for planting.

PLANTING.

The plants should be put out in rows 6 feet apart, and 4 feet apart in the rows; this gives plenty of room to work the ground with the horse-hoe. The young plants are usually suckers obtained from an old plantation. Be careful to select plants from a healthy root stock, as plantations which have been growing for a number of years are sometimes diseased, and young plants from such a source rarely do well, as it takes them two or three years to get into a healthy state again. Three suckers should be planted together about 6 inches apart; this forms what is called the stool. If the plants are put in early during May or June a nice little crop will be obtained the first year.

CULTIVATION.

This will mainly consist of keeping the ground clean with the horse-hoe, and thinning out the young suckers in the spring. The plants generally produce a quantity of suckers that are not required, and if these are left they soon exhaust the soil, robbing the plant of nourishment that should go

towards maturing the fruit. They should, therefore, be thinned out, leaving just sufficient to form canes for the next year's crop of fruit. When the fruit is all gathered, the old canes should be at once cut out; this leaves more room for the young canes to develop.

About the month of June the ground should be ploughed; throw the furrow up to the plants, leaving a furrow down the middle of the row. This drains surplus water off during the winter. About October the ground should be ploughed the reverse way from the plants towards the centre; this leaves a narrow strip which should be levelled into the furrow with a heavy hoe. In a week or two run the horse-hoe up and down the rows, so as to leave the ground perfectly level and in a good state of tilth.

PRUNING, MANURES, &C.

During the winter all surplus suckers should be removed, leaving four strong fruiting canes for the second year's crop. These should be topped to a height of about 5 feet. The following and each subsequent year, six canes may be left for fruit bearing, all others being removed. Stakes should be put in at each stool in order that the canes may be tied up.

The gathering of the fruit extends over several weeks, as the fruit ripens very irregularly. It is, therefore, necessary to gather the ripe berries two or three times a week.

Manure should be supplied to the plants after they have been bearing two or three years. Where farmyard manure is not available, one of the many orchard manures on the market should be used at the rate of 4 cwt. per acre.

The varieties mostly grown are Northumberland Fillbasket, Fastolf, Red Antwerp, Semper Fidelis.

THE PROCLAIMED PLANTS OF VICTORIA.

(Continued from page 688.)

Alfred J. Ewart, D.Sc., Ph.D., F.L.S., Government Botanist; and
J. R. Tovey, Herbarium Assistant.

Nut Grass.

Cyperus rotundus, Linne. (Cyperaceæ.)

Stem $\frac{1}{2}$ to $1\frac{1}{2}$ ft. high, from a short, sometimes creeping, rhizome, the fibrous roots occasionally forming small tubers. Leaves flaccid, much shorter than the stems. Umbel-rays not numerous, the outer leafy bracts seldom so long as the longest rays. Spikelets, very narrow, sharply pointed, varying from 1 to $2\frac{1}{2}$ lines in length, 3 to 8 together, in short spikes at the ends of the rays. Glumes numerous, overlapping, a narrow egg-shape, scarcely pointed, red-brown, with a green keel and light-coloured edge. Style long, 3-cleft. Nut much shorter than the glume. Widely diffused over the tropical and temperate regions of the New and the Old World. It is a troublesome pest in farms and gardens. Continued hoeing in cultivated ground would help to suppress it, but the rhizomes and tubers should be dug out, dried, and burnt. Proclaimed under the Thistle Act for the whole State.—September, 1892.

(To be continued.)

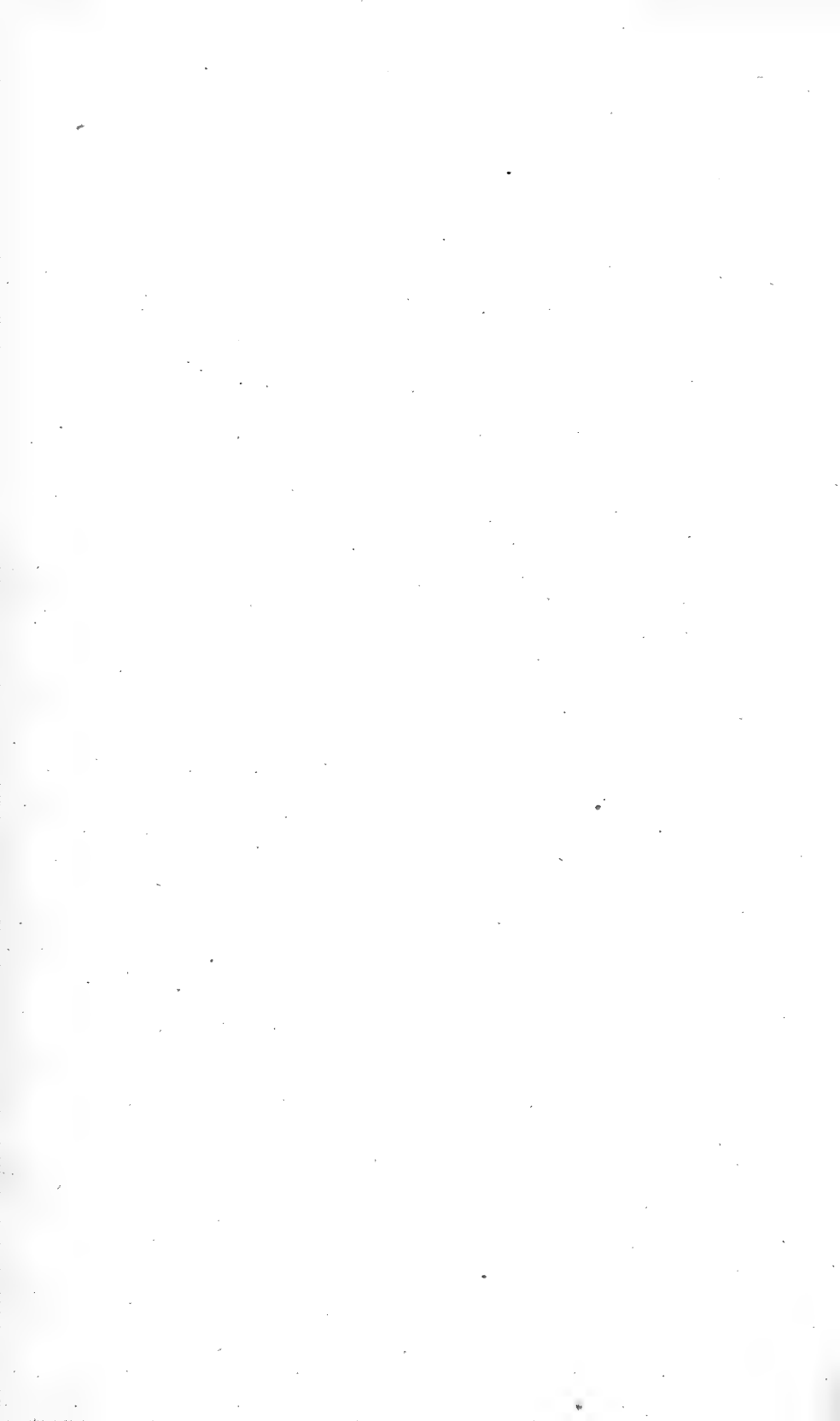


O. Wauer, Del.

J. R. Toxey, Duxbury

J. Kemp, Acting Govt Printer.

NUT GRASS.
(*Cyperus rotundus*, Linne.)



in each case, and the remainder as a rule was much poorer both in yield and cleanness.

Name.	Address.	Cleanness.	Trueness to type.	Freedom from disease.	Apparent yield per acre.	Total.
					Bushels.	
W. Krella ...	Yanac ...	10	9	9	20	48
J. Dart ...	Woorak West ...	9	8	9	20	46
Roberts Bros. ...	Gerang ...	8	9	8	20	45
T. Cunningham ...	Baker ...	8	8	9	18	43
D. Roberts, Senior ...	Gerang ...	9	9	8	16	42
W. Avery ...	Antwerp ...	9	8	9	16	42
J. C. Duffy ...	Lorquon West ...	9	8	8	16	41
Chappina and Dillaca ...	Nhill ...	9	8	8	16	41
C. Cramer ...	Yanac ...	7	8	7	16	38
T. Hornsby ...	Tarranginnie ...	8	8	8	14	38

SUMMARY OF THE WHOLE COMPETITION.

Viewing the whole competition from an outsider's stand-point, there are several matters which excite most favorable comment. First, the



JUDGING A FARMER'S HOMESTEAD AND GARDEN.

friendly manner in which the competition was carried out; second, the healthy spirit of emulation among the competitors; and third, the general excellence of the farms, both large and small, as well as the crops exhibited. I venture to express the opinion that the district generally has gone ahead considerably since 1903, which was the last occasion I had an opportunity to thoroughly inspect it. There is all-round evidence of improvement in farming methods, stock, and the general appearance of the farms. The recent good seasons are, no doubt, responsible for this to some extent, but I ascribe no small portion of the general improvement to the healthy stimulus of the Farm Competition itself.

In view of the amended regulations concerning the Government grant to Agricultural Societies, the farm competitions, as carried out by your Society, are likely to assume an important aspect. The conduct of experimental fields, the holding of farmers' classes, certificates of soundness for stock, and the carrying out of farm competitions are some of the matters which country societies must take up in the future in order to secure the Government grant. Your society has already fulfilled most of these regulations, and I have no doubt your methods in conducting these matters will form the basis of inquiry from other societies in the near future.

CONCLUSION.

This report would be inadequate without some reference to the excellent arrangements made for inspection of the farms and crops. During the eight days the judging was in progress no less than 240 miles were covered by vehicle, and something like 8,000 acres of crops inspected. I am personally indebted to yourself for the arrangements made for my comfort and also to the numerous gentlemen whose hospitality was so freely shown. In conclusion, I trust that your Society will soon take its rightful place as one of the leading educational media in agricultural affairs in the State.

THE PROCLAIMED PLANTS OF VICTORIA.

(Continued from page 736, Vol. IV.)

Alfred J. Ewart, D.Sc., Ph.D., F.L.S., Government Botanist; and
J. R. Tovey, Herbarium Assistant.

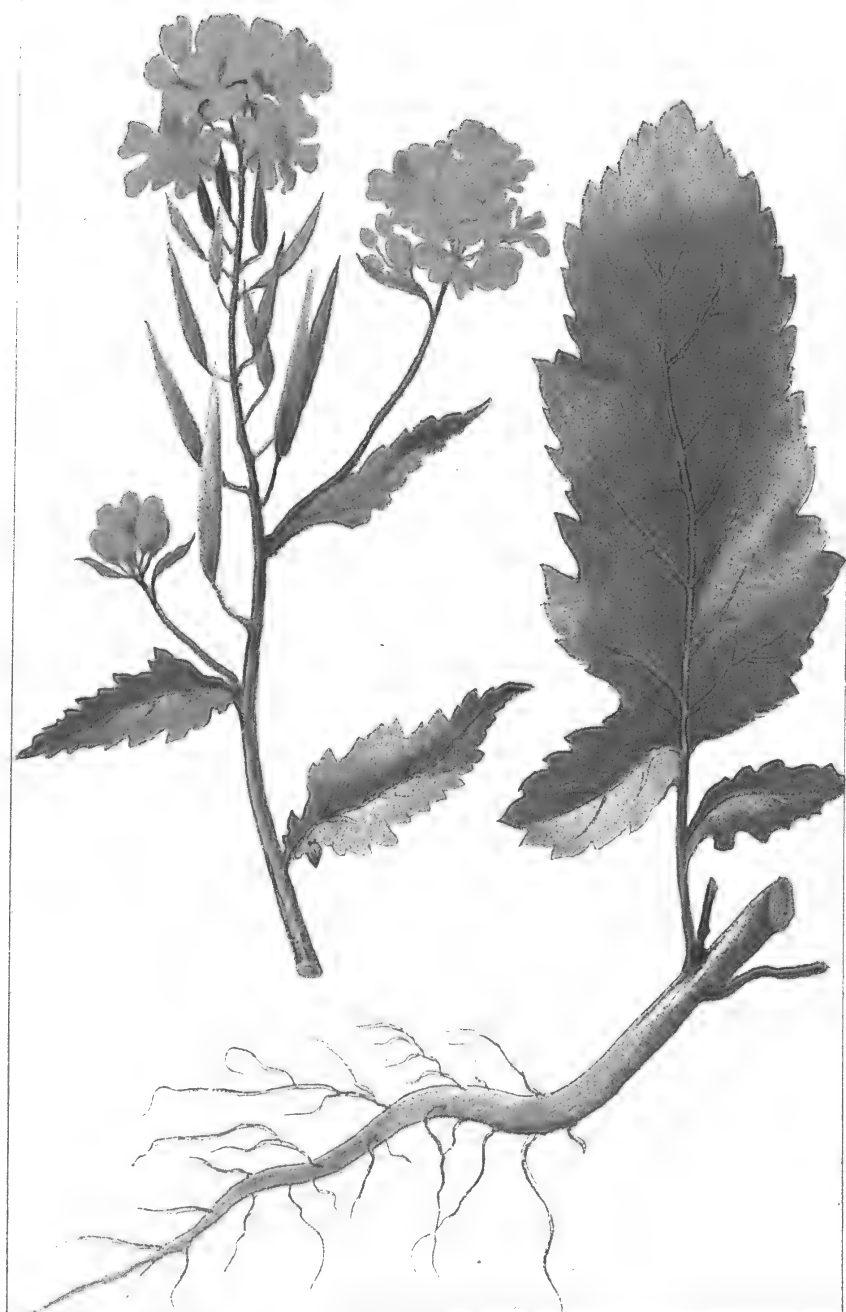
Wild Mustard or Charlock.

Brassica sinapis, Boiss; *Sinapsis arvensis*, L. (*Cruciferae*).

A coarse annual, 1 to 2 feet (30-60 cms.) high, with a few stiff spreading hairs. Leaves rough, with very short hairs, the lower ones usually with one large oval or oblong coarsely-toothed segment, and a few smaller ones along the leafstalk, the upper ones often undivided, oblong, or lanceolate. Flowers rather large and yellow. Pods more or less spreading, $\frac{1}{2}$ to $1\frac{1}{2}$ inches long, of which rather more than a third is occupied by a stout beak, often containing a seed in its base; the valves glabrous, or rough with stiff reflexed hairs, the lateral nerves prominent. A native probably of Southern Europe, but now one of the most abundant weeds of cultivation throughout the world.

It should be pulled up before the seeds mature, or hoed when young during dry weather. Spraying is less effective, but 5 lbs. of copper sulphate dissolved in 25 gallons of water, and sprayed over an acre in fine weather, while the charlock is young, has been found to reduce the evil. When the plant is growing among cereal crops, and ammonium sulphate is used as a manure, it has been recommended in Germany to apply 20 to 25 lbs. per acre as a spray in dry weather while the crop is young. The foliage of other crops than cereals is, however, apt to suffer injury by this treatment. Ground full of seeds should be fallowed, and the seedlings ploughed in as often as they appear in quantity. Proclaimed for the whole State.

PLATE 8.



O. Wulster, Del.

A. J. Ewart & J. R. Torrey, Drexel

J. Kemp, Acting Govt. Printer.

WILD MUSTARD.
(*Brassica sinapistrum*, Boiss.)



Gladioli flowering and other types:—Florence Vaughan, Madame Crozy, Papa, Paul Lorenz, Edouard Andre, Alice Guilfoyle, Queen (Konigin) Charlotte, Emilie Lorenz, Souvenir de Antoine Crozy, Souvenir de President Carnot, L. E. Bally, Doyen Jean Libaud.

Flower Garden.

Dahlias, chrysanthemums, and other plants that bloom during autumn will require special attention during February, if the best results are desired. Dahlias planted about end of December will begin to bloom about end of March if unchecked in their growth. The growths will need to be thinned if exhibition blooms are desired, about eight shoots being enough to leave. These should be securely tied to stakes as growth advances. When the buds appear, they also need thinning, and may be "timed" to produce the blooms at intervals by selection of buds of varying size. The largest bloom is generally developed from the central bud of the shoot, but there is nothing like the need of saving "crown" buds on the dahlia as there is on chrysanthemums. In the latter case, if the crown bud is lost, all hope of the shoot producing a first-class flower is gone; but the dahlia will produce good flowers from almost any bud when well-grown. Where the plants are not growing satisfactorily, although watered, a solution of nitrate of soda, or sulphate of ammonia, used at rate of 1 oz. to 6 gallons of water, will probably be of benefit. The plants must be forced to grow freely this month to produce good flowers in season.

Chrysanthemums grown for large blooms produce their late crown buds this month. These must be "saved" as soon as the shoots surrounding the buds can be safely removed. The flower bud is placed in the centre of the point of the shoot, and is easily distinguished from the growth buds. A brighter-coloured and more refined bloom is developed on the second crown bud than on those produced earlier. The larvæ of a number of small moths attack the buds in most places. A rolled leaf is an indication of their presence, and they should be carefully sought for and destroyed. A light dressing of some complete manure may be applied and lightly worked between the plants about the end of the month. Peruvian guano is one of the best manures for the purpose.

Roses may be pruned lightly and started into free growth by application of water. The plants, when so treated during February, produce good blooms early in autumn, and if supplied with some liquid manure, or quick-acting artificial manure, will often give more satisfaction than in spring. This is particularly the case with plants of the tea and hybrid tea sections. In summer pruning of roses, the plants should not be beheaded as in winter, a thinning of the weakly and very soft shoots and light topping of the remainder being all that is necessary. As much foliage as possible should be saved; and where mildew and aphid are usually found to attack the plants, a spraying with liver of sulphur or "nikoteen" should be applied on the first appearance of either. Dusting with flowers of sulphur is a substitute for spraying with liver of sulphur (sulphide of potassium) against mildew.

Carnation layers should be kept moist. Strong young plants will thus be available for planting early in autumn, and will become well established before the ground becomes cold in winter. Fine flowers may be expected from such plants in spring.

A number of spring and autumn flowering bulbous plants may be planted, including *Amaryllis*, *Brunsvigia*, *Nerine*, *Ixia*, *Narcissi*, and many others.

Ground should be prepared for the reception of seeds of hardy annuals. These may be sown in beds or boxes, the young plants being afterwards transplanted into their flowering quarters.

Kitchen Garden.

Growing crops will require as much water and cultivation as possible. Free, unchecked growth is necessary, or the produce will be tough and poor in quality. Where water is scarce, only a limited quantity of hardy vegetables should be grown, and these should be well cared for.

Ground should be prepared for receiving crops that will mature in winter and spring. After any crop is gathered or cut, the soil should be deeply dug and well manured, even if cropping is not immediately intended. The soil will be in good growing condition when required, and the fertilizing properties in the manure conserved. Seed of cabbage and cauliflower may be sown in beds for transplanting. In preparing beds for such seeds the soil should be finely worked and well enriched. Seed should not be sown broadcast on dry soil. The beds should be firmly rolled and pressed, and watered prior to sowing. The seed should be covered with light soil to a depth of about half-an-inch, and lightly mulched with horse droppings. Should aphids attack the young plants in the seed beds, they should be sprayed with a solution of fir-tree oil. No old plants that are liable to be affected by cabbage aphids should be allowed to remain in the proximity of the beds.

Succession sowings may be made for peas, beans, and saladings, and transplantings made from former sowings.

THE PROCLAIMED PLANTS OF VICTORIA.

(Continued from page 28.)

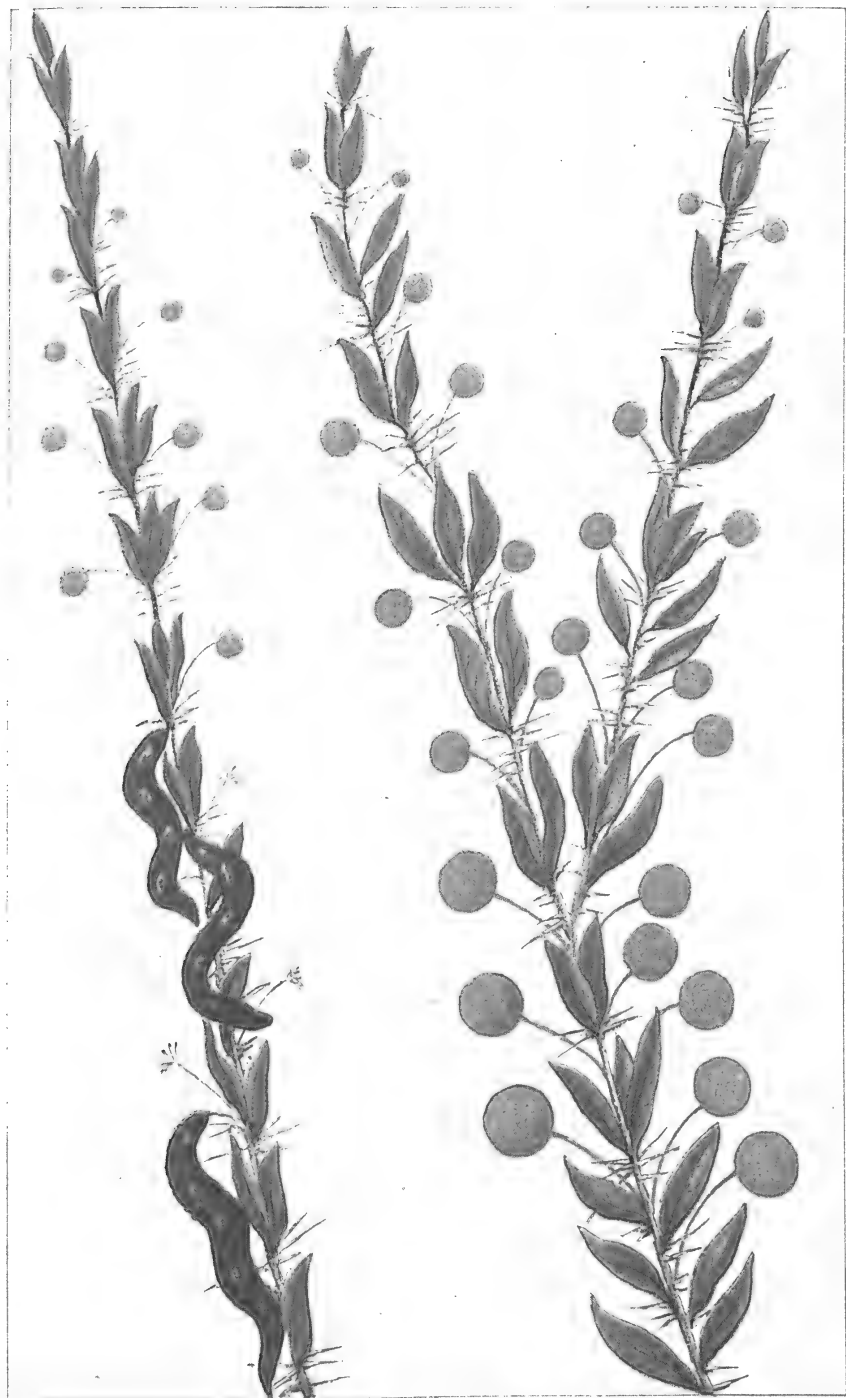
Alfred J. Ewart, D.Sc., Ph.D., F.L.S., Government Botanist; and
J. R. Tovey, Herbarium Assistant.

Acacia-hedge.

Acacia armata, R. Brown. (Leguminosa).

A bushy shrub, with angular, striate (grooved) branches. The flattened leaf stalks resemble leaves (phyllodes), and are semi-ovate, oblong, often wavy, with a central midrib, about 1 inch long. Stipules spiny, 4 to 5 lines long. Flower-stalks as long as the phyllodes, bearing globular heads. Pod $1\frac{1}{2}$ to 2 inches long, 2 or 3 lines broad. Seeds oblong, the funicle forming three or four folds. Indigenous to Australia. This well-known hedge-plant varies considerably, sometimes attaining to a height of 10 feet or more, and, being perennial, is difficult to eradicate; it should be dug up before flowering. Proclaimed for the shires of Dundas, Frankston and Hastings, Hamilton, and Portland.

PLATE 9.



O. Wauer, Del.

J. P. Torrey, D. Des.

J. Kemp, Acting Govt. Printer

ACACIA HEDGE.
(*Acacia armata*, Rob. Brown.)



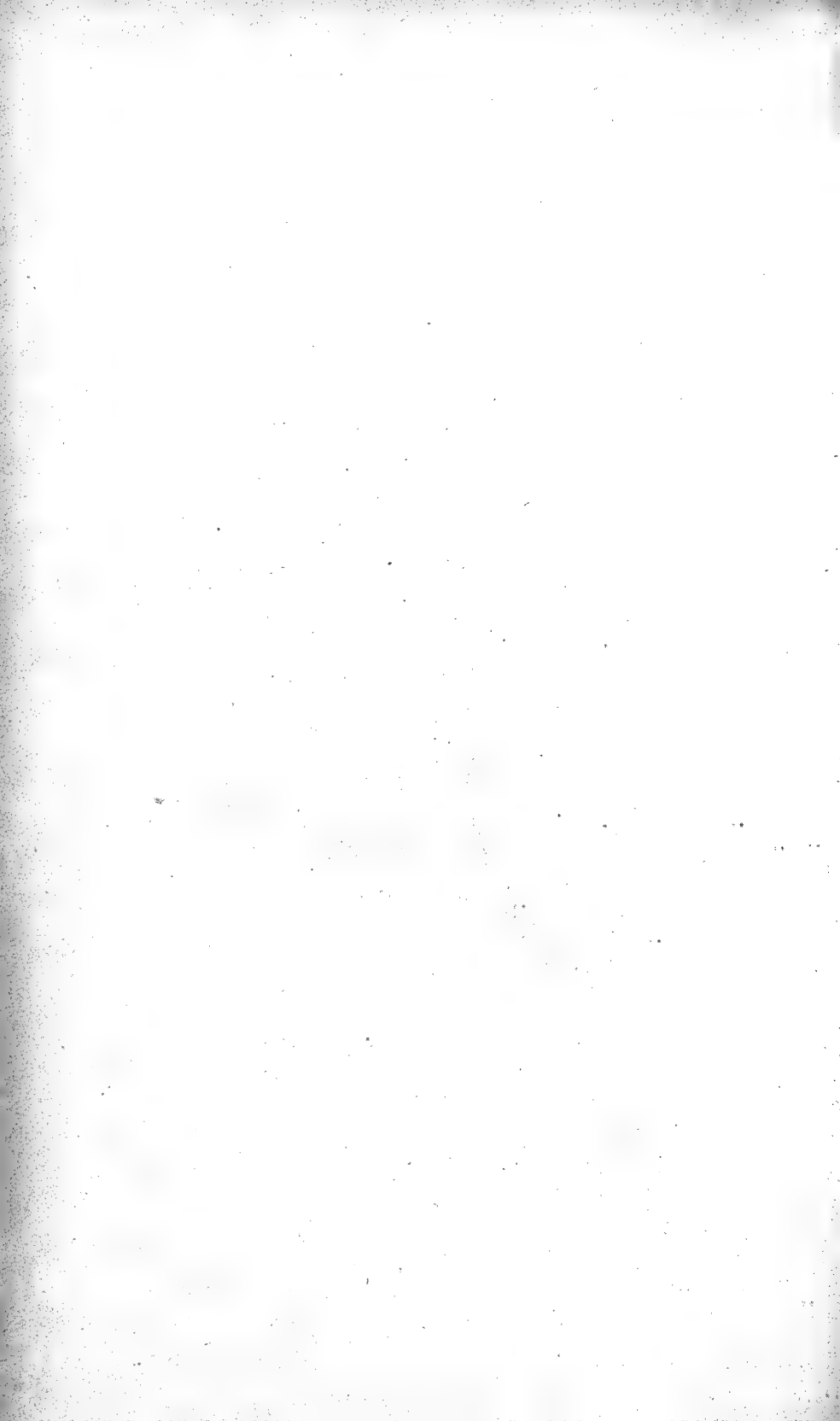
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J. H. 1878. Acting Govt. Printer.

CAPE BROOM.

(*Cyrtisus canariensis*, Steudel.)



4. *Improvement of Poor Soils.*—The use of superphosphates and the adoption of some such system of rotation as oats, peas, rape, barley or wheat, most of the produce to be fed to live stock on the farm, will at once start a man on the up-grade. Grass land top-dressed with superphosphate or bonedust will rapidly increase in stock-carrying capacity.

CONCLUSION.

But suppose our present bright prospects of profitable markets disappear, there is no question but that with our present small population over production would ensue, and much of our existing industrial buoyancy would disappear also. But the farm, as a home, would remain, and would offer even a better field for well-directed energy. Under such circumstances, in comparison with trade and manufacture it is probable that agriculture would be more highly thought of than it is in periods of prosperity. Its attractions to the most progressive units in the population would be greater than ever. There is the old saying that the farmer is the most independent of men. The endless modification of the details of successful farm practice offers ample scope for every one to develop along his own special line. He may vary the purposes for which he uses his land and still be quite as successful as his neighbours. If enthusiastic at his work he may follow his bent to its full scope and still be successful. It makes no difference whether he specializes in crops or animals or simply holds to all-round farming. There is the life-long satisfaction of feeling that you are making progress from year to year. That next season you will make the poorer part of your land a step nearer to the best. That you will weed out the least profitable of your live stock and replace them with something better than your best. That after you have weathered one bad year you will be in a stronger position to meet another. In a word, it is the privilege of the farmer to know that his future is more in his own hands than is the lot of most other men. That if he keep on sound lines Nature will be true to him, and that his upward progress, though it may be slow, is not the less certain to be sure.

THE PROCLAIMED PLANTS OF VICTORIA.

(Continued from page 104.)

Alfred J. Ewart, D.Sc., Ph.D., F.L.S., Government Botanist; and J. R. Tovey, Herbarium Assistant.

Cape Broom.

Cytisus canariensis, Steudel (*Leguminosæ*).

A hardy evergreen shrub, 4 to 10 feet high. Branches angular; leaves, with three leaflets, and, as well as the branches, clothed with soft hair or down, leaflets obovate-oblong. Heads of flowers, terminal, yellow, pod clothed with white hair. A native of the Canary Islands. It should be dug up before flowering, and, being perennial, the root, as well as the stem, should be removed. Proclaimed for the Shires of Creswick, Glenlyon, Heidelberg, Kyneton, Kilmore, Lilydale, Lexton, Malmesbury, and Springfield.

IMPROVEMENT IN HORSE-BREEDING.

ACTION BY VICTORIAN GOVERNMENT.

REPORT BY MR. S. O. WOOD, V.S., ON HIS MISSION TO EUROPE.

With a desire to furnish some practical means of arresting the generally recognised deterioration in the horse-breeding industry, the Honorable the Treasurer, towards the end of 1905, allotted the sum of £3,000 as a grant to be devoted to the improvement of horse-breeding. Subsequent to a conference between the Minister of Agriculture (Honorable Geo. Swinburne) and representative horse-breeders, a committee was appointed, consisting of Mr. Robert Clark, Mr. W. J. H. Campbell, the Director of Agriculture (Dr. Cherry), the Chief Veterinary Officer (Mr. S. S. Cameron, M.R.C.V.S.), and the Chief Inspector of Stock (Mr. J. R. Weir), to advise the Government as to the best means of applying the grant.

As a basis of discussion for the Committee, the following outline of three schemes was prepared by the departmental officers:—

I. FREE GOVERNMENT CERTIFICATION OF STALLIONS STANDING FOR PUBLIC USE—

1. The Government to undertake to have all stallions standing for the use of public examined for soundness, free of cost, by qualified veterinary surgeons selected for the purpose.

2. The examinations to be conducted at certain advertised centres in each district throughout the State during the months of June, July, August, and September in each year.

3. The examining veterinary surgeons to report to the Department, and, in the case of stallions to be certified, the official Department of Agriculture certificate of soundness to be issued within fourteen days of the examination.

4. Certificates of soundness to be issued in the case of all stallions not found to be affected with hereditary unsoundness. Unsoundness the result of work or accident, and blemishes not liable to be transmitted, are not to disqualify.

5. A condition of the Government grant to Agricultural Societies in the future to be that none but certified stallions shall be awarded prizes in breeding classes.

II. INSTITUTION OF DISTRICT PREMIUMS FOR STALLIONS—

A. 1. For stallion premium purposes the State to be divided into (say) fifteen districts.

2. In each of these districts a parade of stallions to be held on a date to be fixed during the month of July or August, at which all stallions entered for competition will be judged by a committee of three expert judges appointed by the Government.

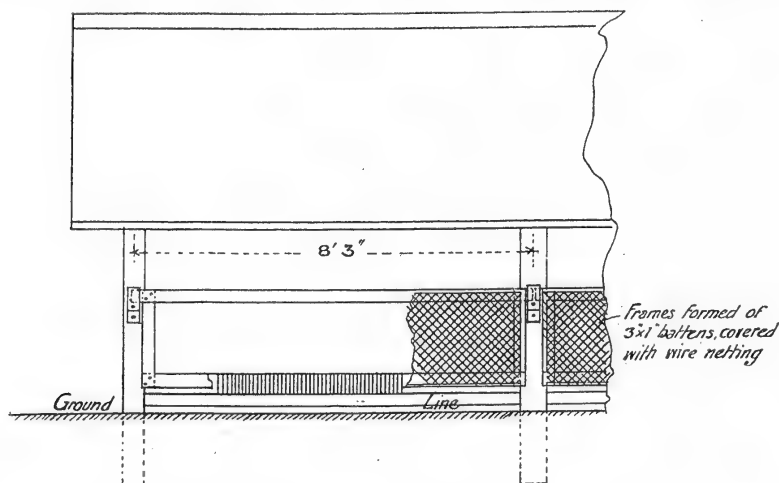
3. The first prize-winner in each district (or possibly, in the case of large districts, the two first) to be awarded a premium of £200 on the following conditions:—

a. That the premium stallion be travelled through the district according to an agreed route and fixed daily time-table.

b. That the services of the premium stallion be made available for the service of at least 60 mares (the *bona fide* property of farmers whose

the result that the plant has to struggle against adverse conditions. For the potato plant to flourish, a temperature of over 60 degrees is required. In support of this I may mention a parcel of Early Rose and Carman No. 1 seed planted in my own field. The seed was dug early in April, spread out all the winter on the barn floor, cut mostly to a single eye, and planted on the 6th December. They were above ground in ten days, and before the 6th January many of the plants were in bloom. By the end of the first week in February, or under ten weeks after planting, there was a crop of tubers large enough to lift; but, of course, too green to handle.

It should be remembered that the fine texture and early varieties are liable to injury if stored in pits, especially so in districts where planting cannot start until the end of October or the beginning of November. By this time the days are lengthening, and the temperature is increasing



SIDE ELEVATION.

daily, causing the tubers to throw out their buds, and, as they are closely packed together, the air cannot circulate through the heap. The result is that the potatoes soon become a mass of sprouts, and long shoots force their way to the open air. Further, in this unventilated condition they heat, and soon begin to rot. Tubers kept in this way will, when cut, immediately turn black inside, and, if planted, are sure to rot, while whole tubers are very little better.

Instances have come under my notice this season where crops of early potatoes have failed or missed badly. Had the seed been kept under proper conditions, this would not have occurred.

The accompanying illustration of a shed for storing seed potatoes will give some idea of what is required. The posts are 4 ft. 6 ins. out of the ground, carrying a plate at the top to take the rafters. The material of the roof should be of thatch or bark, and should project at least 2 feet over the sides of the shed. The floor should be 6 inches off the ground at the outside, and slightly raised at the centre; it should be composed of 1 1/2-in. x 1-in. battens, laid on edge, and fastened to the joists, the battens being spaced at such distances as not to allow the small sets to

pass through. The tubers will require turning, and for this work a wooden fork should be made. The prongs of the fork should correspond with the spaces between the battens, so that in turning the tubers they will run in the spaces and not injure them. If poultry can get at the tubers it will be necessary to protect them with wire netting fixed to frames as shown in the sketch.

The shed may be constructed of any material available on the farm, and in addition to the floor shown in the illustration could be made to take one or more tiers of trays, thus providing a much larger space for storage under the same roof. Trays can be made from the cases in which galvanized iron is packed cut to a handy size, about 2 ft. by 2 ft. 6 in. If trays are used it will be necessary to put in uprights to carry them. The space to accommodate a ton of potatoes spread out to a depth of 5 inches is about 10 x 12 feet.

Seed tubers are in the best condition for planting just when the bud starts; this condition is hastened when the temperature of the atmosphere reaches in the day time to 60 degrees and over. Consequently tubers dug in the summer are usually ready to plant in from 5 to 7 weeks after digging, but the sprouting can be retarded for long periods by keeping the seed below 40 degrees.

In the cooler districts along the Dividing Range potatoes dug in April are usually ready to plant in the same district by September, but may be planted during July and August in the earlier districts near the coast.

THE PROCLAIMED PLANTS OF VICTORIA.

(Continued from page 137.)

Alfred J. Ewart, D.Sc., Ph.D., F.L.S., Government Botanist; and
J. R. Tovey, Herbarium Assistant.

English Broom.

Cytisus scoparius, Link (Leguminosæ).

A shrub of 2 to 6 feet, nearly glabrous, but the younger branchlets and leaves silky, with numerous long, straight and erect, green, wiry branches prominently angled. Lower leaves shortly stalked, with three small, obovate leaflets; upper leaves sessile, or shortly stalked, the leaflets often reduced to a single one. Flowers large, bright yellow, solitary or in pairs, on slender pedicels, in the axils of the old leaves, forming handsome leafy racemes along the upper branches. Petals all broad, the standard broadly orbicular, the keel deflected. Pod $1\frac{1}{2}$ to 2 inches long, flat, brown, or black, hairy on the edges, but glabrous on the sides, the seeds attached to a line considerably within the edges of the pod.

A native of Europe, Northern Asia, the Canaries and Azores. This hardy, deciduous shrub is very difficult to suppress; it should be dug up before flowering, and the root-stock removed from the soil, or it will grow again. Mowing will prevent the seedlings from re-establishing themselves, but not grazing. Proclaimed for the Shire of Glenlyon, July, 1902.

2. The investigation and diagnosis of OUTBREAKS OF DISEASE, as well as the instituting of preventive and suppressive measures in the case of epi- and enzootics.

3. Experimental RESEARCH is also conducted as opportunity offers.

4. FIELD-WORK.—A proportion of the staff is distributed throughout the chief agricultural districts in order to carry out prophylactic measures in regard to black-leg, tuberculin inoculations, to demonstrate the Departmental methods of dealing with contagious abortion, milk fever, and contagious mammitis, and to keep a sharp look out for any disease—sporadic or infective—which is likely to require consideration at head-quarters. These are the officers that, by skilful and scientific methods at the steading or in the paddock, have brought home to the farmers the value of rational remedies.

5. LECTURING.—This branch of the work has been given a prominent position in the official programme, but though prosecuted with unwearying diligence, the results have not been wholly satisfactory. The opinion of Mr. Gilruth is not in favour of free lectures; he finds from experience that better attendances are insured if a small fee—say, 5s. for the course—be levied. However, it should be noted that no examinations were held in connexion with the New Zealand classes, nor were any certificates or other form of inducement offered, as is the case in Victoria. Probably, also, the extraordinary prosperity of the country has, to a certain extent, diverted the attention of the farming community from the manifold advantages to be gained from veterinary instruction. It is only fair to add that some excellent veterinarians are naturally unfitted for this particular class of work. Personally speaking, I am strongly of opinion that no great good can be accomplished by any lecturer who does not take occasion to demonstrate clearly and forcibly in the field that his scientific utterances are worthy of every attention from the practical farmer. He must come out from behind the lecturing desk, and actually perform the work which he has prescribed and explained. Having gained the respect and confidence of his audience in this way—and he can do so by no other means—his explanations and words of advice will be received with gratitude and credence. Where this idea can be adopted I am convinced that neither class fees nor examinations are essential to success.

6. INSPECTION OF DAIRIES.—This has only been spasmodically performed, owing to the lack of available officers. On several occasions efforts have been exerted to place this important work on a satisfactory basis, but so far without avail. Compulsory registration and routine inspection are still amongst the ambitions of the Department, so that Victoria has nothing to learn, at present, from New Zealand as far as veterinary inspection of dairies and dairy farms is concerned. In a few instances, the inspectors at abattoirs act as local dairy inspectors, but there is no general scheme yet in vogue for the whole Colony.

A consideration of the system of dairy supervision that obtains in Victoria brings up the question of the relative advantages and disadvantages of establishing a numerically strong qualified staff of veterinarians by Colonial Governments. Under some conditions, this has proved a most unwise procedure; but in New Zealand, thanks to the enormous development of the frozen meat trade, the circumstances are exceptionally favourable. With an industry of this nature, careful inspection by trained men was an absolute *sine quâ non*—in fact, the companies would in any case have imported their own inspectors to secure the confidence of the public. The opportunity, therefore, of establishing and maintaining a powerful

Veterinary Department was almost without a parallel in the history of the British Colonies, and New Zealand was peculiarly fortunate in having a man with Mr. Gilruth's perspicacity and force of character to grasp the situation and initiate the movement. Were the whole burden of such a staff to be borne by the ordinary taxpayer, it is not difficult to see that such a system is apt to break down, and it would be courting failure to attempt to run a similar department unless some means of defraying the cost is devised. Why New Zealand should be exporting 1,750,000 cwt. of mutton per annum, and the whole Australian Commonwealth only 600,000 cwt., is by no means so clear, more especially as the Australian lamb and mutton—to a very large extent grass-fed—are on the London market 6—8 weeks earlier, and, moreover, the New Zealand sheep are almost invariably fattened, or at least "topped off," on such expensive forage crops as rape, kale, turnips, and mustard. Perhaps when the Australian farmers are more alert to the importance of the sheep-raising industry the freezing trade will expand as it has done across the water, and therein may arise an emphatic demand for the appointment of a numerically strong staff of veterinary officers.

It is interesting to record the fact that the New Zealand Government has so far recognised the necessity of keeping in close touch with scientific progress in Europe as to grant, at intervals, to the chief of the division sufficient leave of absence to enable him to visit the chief British and Continental laboratories, and to keep in personal contact with the leading savants of the Old World.

THE PROCLAIMED PLANTS OF VICTORIA.

(Continued from page 230.)

Alfred J. Ewart, D.Sc., Ph.D., F.L.S., Government Botanist; and
J. R. Tovey, Herbarium Assistant.

The Furze.

Ulex Europæus, Linné. (Leguminosæ.)

A shrub of 2 to 3 feet, or even twice that height when old and luxuriant, more or less hairy, especially on the main branches; the numerous short, intricate, small branches all ending in a stout thorn. Lower leaves occasionally lance-shaped, but the greater number reduced to thorns, up to a centimetre in length or more. Flowers fairly large, solitary, in the axils of the leaves on the preceding year's shoots, forming showy racemes, intermixed with thorns at the end of the branches. Calyx yellow like the petals and but little shorter, clothed with brownish hairs, with a small, broad bract a millimetre or two in length on each side at the base, besides a similar bract under the short pedicel. Petals narrow.

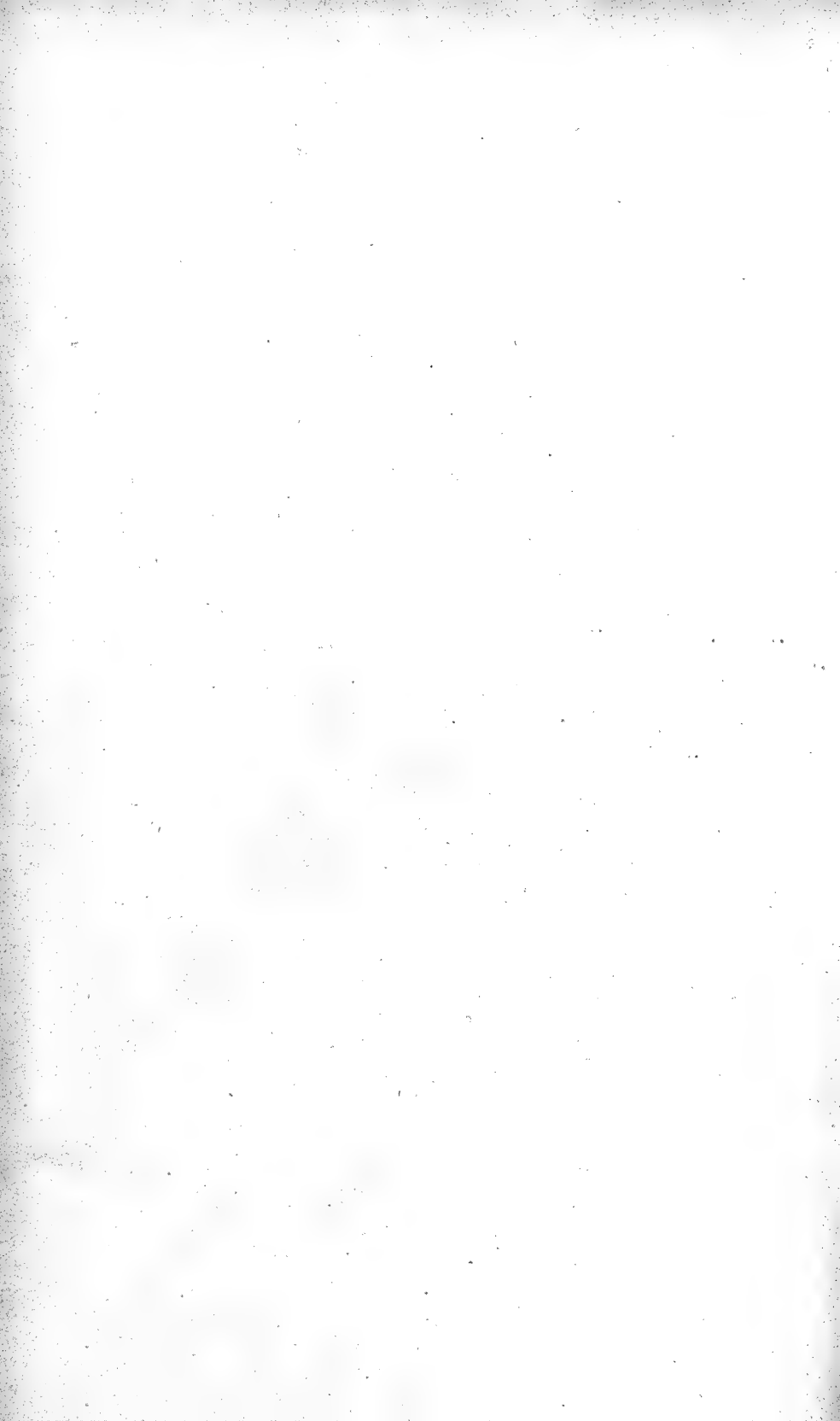
An introduction from Europe. In Western France, its branches are crushed for fodder, and when chopped are used as kindling wood. Cows will browse on the young shoots. This perennial hedge-plant, owing to its strong growth, is hard to eradicate, especially on sandy soil, but is easily killed on land that can be flooded. If kept closely trimmed it flowers but little, does not spread, and forms a good hedge-plant. A neglected hedge, however, soon becomes a permanent danger.

Proclaimed under the Thistle Act for various districts, comprising the greater part of the State.



FÜRZE

Ulex europaeus L.



Roses may be planted now, but pruning is not advisable until next month. Where cuttings are required for propagation they may be taken without entirely pruning the plants. If the soil in which roses are to be planted is light or sandy, the addition of clay is necessary to insure success. In deep sandy soils rose plants often produce very strong shoots early in the season that fail to ripen and often die back in winter. This would be prevented in a measure if the soil was rammed hard before planting the rose. Any manure used when planting should be fairly rotted, and worked into the soil below and around the site intended for the plant, but should not be brought into contact with roots. Rose-growers are usually anxious to know the probable value of the new varieties that are distributed each season by the nursery trade. Several of the new kinds offered this season are very promising including Mrs. Myles Kennedy, silvery white, flushed and edged with pink; William Shean, pink, a very promising variety; Mrs. Peter Blair, deep yellow, may not be large enough for exhibition, but a good rose for the garden; Madame Constant Soupert, yellow, shaded peach; Mrs. G. W. Kershaw, pink, resembling Belle Siebrecht; Lady Rossmore, reddish crimson; Warrior, deep red, a decorative rose resembling Papa Gontier, but much darker in colour; and Lena, also a decorative variety, producing long buds of a bright apricot colour.

Chrysanthemums should be removed from the beds where they were grown to produce large blooms, and should be replanted in an open position in unmanured soil. The sucker growths may be infested by aphids and should be cleaned before being replanted. The easiest and most effective method is to divide the stool or crown and *dip* the divisions in a strong nicotine solution.

As dahlias die down the tubers may be lifted and stored in a cool dry place, free from draught. Where dahlias are ripening their seeds and the weather is continuously moist, damping of the seed heads is likely. It is well to remove any that are at all ripe, and to clean the seeds and dry them before a fire, otherwise the whole may be lost.

Carnations should be tied to stakes. The winter blooming kinds should now be showing flowering growths freely, and will be benefited by a light application of blood manure or other rapid acting fertiliser. Disbudding is necessary if fine blooms are desired.

Kitchen Garden.

Soil should be prepared for the reception of the various crops that will be needed to supply the requirements of the cultivator during spring and summer. In limited areas the cultivation of various vegetables that require to be used when freshly gathered should be specially aimed at. Most kinds require a cool, rich, well-drained soil to attain excellence, and while many will succeed in light, sandy loams, others are produced in fine condition with little difficulty in soils of opposite character. In the light warm soils at Brighton, cabbage, cauliflower, early potatoes, and onions are grown in quantity; at Coburg, in stiff clays, the best celery in the metropolitan district is produced; while the Burwood gardeners, from soils of a loamy nature, provide a large proportion of the peas sold in the market early. Large quantities of manure are applied regularly in all classes of soils, due regard being paid to proper rotation.

Onions may be planted out from early sowings. The soil should be thoroughly worked, and brought to a condition of fine tilth before planting. Unless the soil was heavily manured for a previous crop the addition of manure is necessary. Onions need constant and perfect surface cultivation during the growing period. Seeds may be sown for later transplanting or for salading.

Successional crops of peas, lettuce &c. may be sown. Some fine specimens of a new rhubarb were shown at the autumn horticultural exhibitions. It is named "Stone's Ever-bearing Ruby," and is a locally-raised variety. The stems are of good colour, large but not coarse, and are freely produced during winter and summer.

THE PROCLAIMED PLANTS OF VICTORIA.

(Continued from page 276.)

Alfred J. Ewart, D.Sc., Ph.D., F.L.S., Government Botanist; and
J. R. Tovey, Herbarium Assistant.

Sweet Briar.

Rosa rubiginosa, Linné (*Rosacæ*).

A tall often dense shrub, branches erect or arching, with large hooked prickles flattened laterally, and smaller, straighter ones interspersed with glandular hairs. Leaflets 5 to 7, roundish or egg-shaped, doubly toothed, glabrous above, hairy, clothed with rust coloured glands beneath, from which when bruised is emitted the peculiar sweet-briar odour, for which the plant is noted. Flowers 1 or 3 together, concave, pink. Sepals pinnate and bristly. Fruit orange-red, roundish or ovoid.

This hardy deciduous shrub has been introduced from Europe, and has spread over a considerable area of the State. The plant should be dug out, the roots removed and the whole dried and burnt. This should be done before the plant has fruited.

Proclaimed for various districts comprising nearly the whole State.

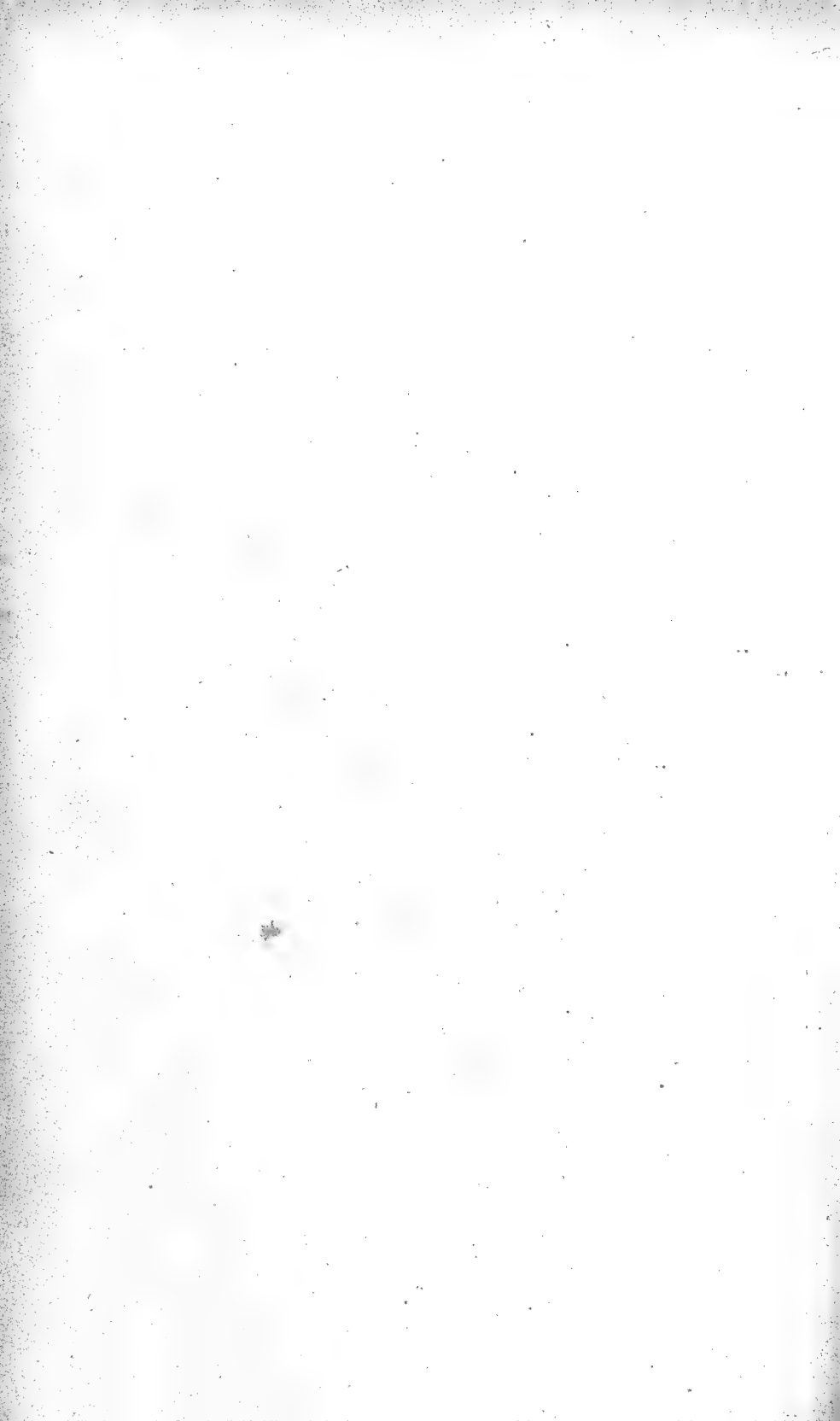


O. Weiler, Del.

J. R. Terry, Direct.

J. Kern, Acting Gr. Printer

SWEET BRIAR.
(*Rosa rubiginosa*, Linné)



SELECTION OF VARIETIES.

A number of varieties of many of the types undermentioned are available in Melbourne, from the nurserymen or seedsmen. *Iris Germanica*, many varieties; *Kämpferi*, many varieties; *fimbriata*, *florentina*, *pavonia*—the peacock iris; *Xiphium*—Spanish iris, many varieties; *Xiphioides*—English iris, many varieties; *ochroleuca*, *pallida*, *reticulatum*; *stylosa*, and *stylosa alba*—winter flowering species; *bicolor*, and many others.

Flower Garden.

The continuance of manuring and digging flower borders, and the preparation of beds for special subjects, and pruning roses and other plants may be styled routine work for the present month. Beds for chrysanthemums and other plants cultivated for specially fine blooms should be prepared now, as far as adding stable manure and roughly digging to sweeten the soil. If the plants previously grown in the beds were infested with aphids or other insects, a dressing of gypsum (sulphate of lime) is advisable. It will destroy many insects and act as a manure also, and is a cheaper and better dressing than the slaked lime so commonly used.

Roses may be pruned during this and next month. Hybrid perpetuals should be pruned first; hybrid teas and teas later. The hybrid perpetuals are practically without leaves now, and may be cut hard back without detriment. Many of the tea roses are still in full leaf some even making new growths, and though they may be thinned it is not wise to behead them too early in winter.

A deal of improvement is noticeable in methods of pruning flowering plants generally, which is in a great measure due to the various horticultural societies in the State. Lectures are delivered, papers read, and practical demonstrations carried out by competent persons at meetings arranged by these societies, and information on important matters is spread over a greater range than would be likely from a few larger associations. Combined exhibitions may be wise and even necessary, but numerous, if small, societies and frequent meetings are undoubtedly of benefit to cultivators of all grades.

The most common fault in pruning roses is overcrowding of shoots, especially in the top of the plant. More thinning, *i.e.* entire removal of shoots, and less shortening back of those allowed to remain would be of benefit. The centre of the bushes should be fairly open, and old and weakly wood pruned away leaving a few strong well arranged shoots. In shortening the shoots that are reserved, the pruner must be guided by the vigor of the specimen dealt with, and in a measure with the characteristics of the variety. Weakly shoots must be cut back much harder than strong ones, and the plants will be better, much larger, and will produce finer blooms than if an excessive number of branches was saved. In the case of climbing varieties, old shoots should be cut right away, and the young shoots that have developed tied or trained in their stead and lightly topped. This treatment should not be applied to the Banksian, Fortune's Yellow, and other early blooming kinds, which should not be pruned until after flowering in spring. Newly planted roses should be pruned hard at time of planting.

Sweet peas may be sown for late blooming, and bulbs of early gladioli planted. Summer blooming lilies may also be planted, care being

taken that no organic manure comes into contact with the bulbs. Hardy annuals may be transplanted, and where such are growing thickly in patches where it is intended they shall bloom, they should be thinned and kept free from weeds.

Kitchen Garden.

Preparation of soil for future planting, and sowing seeds of various vegetables for spring use may be done. Planting out onions and asparagus from earlier sowings; preparation of manure for hot-bed where it is intended to raise tender plants early; and weeding and cleaning growing crops are seasonable operations in this department.

THE PROCLAIMED PLANTS OF VICTORIA.

(Continued from page 336.)

Alfred J. Ewart, D.Sc., Ph.D., F.L.S., Government Botanist; and
J. R. Tovey, Herbarium Assistant.

Blackberry Bramble.

Rubus fruticosus, Linné. (Rosaceæ.)

The struggling stems arise from a perennial rootstock, without underground creeping shoots; the flowering stem, biennial, or of a few years duration, sometimes nearly erect, but more frequently arched, straggling or prostrate, often rooting, and forming fresh plants at the extremity, usually armed with prickles, either stout and hooked or thin and straight, with stiff hairs, or glandular bristles, or a short down, all variously intermingled or occasionally wanting. Stipules awl-shaped, or linear, inserted a short way up the leafstalk. Leaflets rather large, and coarse, either 3 or 5, the 2 or 4 lower ones inserted together at some distance below the terminal one, egg-shaped toothed, more or less downy, the midribs as well as the stalks usually armed with small hooked prickles. Flowers white or pink, in panicles at the ends of the branches. Fruit black, or very rarely dull red, not separating readily from the receptacle, the calyx usually turned down under it, or seldom closing over it.

An introduction from Europe and Asia. This hardy deciduous trailer has spread to a great extent, and is difficult to eradicate, especially when in hedges. In open ground it is easily kept under by cutting down to the base twice a year. Systematic eradication involves however the removal of the rootstock and the prevention of flowering and fruiting.

Proclaimed for various districts.



O. Walter, Del.

A. Ewart & J. R. Tovey, dres.

J. Smith, Sculp.

BLACKBERRY BRAMBLE
(*Rubus fruticosus*, Linné)

Flower Garden.

Pruning of roses should be completed by mid-August in the greater part of the State. In cold and late districts the operation may be deferred till later, but when the growth buds are showing prominently along the shoots, the dormant season has passed and pruning should be finished. Roses were badly infested by aphids during autumn and winter, and close observation will probably show that the buds on the shoots that remained after pruning are still infested. The plants should be cleaned at once, and prunings burned or buried deeply. A strong soap or tobacco wash, or a mixture of each, will destroy the aphides, and no harm will ensue if the application is sufficient to drench the soil at the base of the plants. An infusion of tobacco should be used, not a boiled and comparatively useless solution. One thorough spraying is necessary, which should be repeated if any aphides are present a few days later.

Divisions of herbaceous plants may be planted. Many of the finest summer flowering plants are of this class, and will repay, by abundance of fine flowers in season, a thorough preparation of the soil before planting. The tall and large leaved kinds, such as cannas, require a deep and well enriched soil to assure a supply of moisture at the roots, sufficient to maintain a large evaporating surface of foliage during dry weather. Plants with abundant leafage need abundant moisture and cool soil during summer. When the plants are set out and sufficient water applied to settle the soil around them, a mulching of stable manure will lessen the need of after watering. The surface should be reduced to a fine condition before applying the mulch. Herbaceous plants suitable for most parts of the State are delphinium, perennial phlox, canna, pentstemon, helianthus, dielytra, shasta daisy, oriental poppy, peony, tritoma, hemerocallis, rudbeckia, salvia (herbaceous). Bulbs of gladioli may be planted to flower early and divisions of dahlias for the same purpose. Seeds of hardy annuals may be sown, and transplantings made from sowings in autumn.

Vegetable Garden.

Ground should be in readiness for planting out from former sowings, and sowing seeds of most vegetables in demand during the summer. In limited areas, if the soil is suitable, vegetables that require to be used quite freshly gathered to give satisfaction should be grown. Herbs and saladings are worthy of consideration and can be grown well in small gardens. The class of vegetables grown should be changed as often as possible. Better results are obtained by a quick rotation, and also greater immunity from insect and fungoid attacks. Growing crops should be thinned, and kept free from weeds. The hoe should be kept going between the rows, and the soil brought to as fine a condition as possible.

THE PROCLAIMED PLANTS OF VICTORIA.

(Continued from page 438.)

Alfred J. Ewart, D.Sc., Ph.D., F.L.S., Government Botanist; and
J. R. Tovey, Herbarium Assistant.

The Chinese Scrub.

Cassinia arcuata, R. Brown. (*Compositæ*.)

An erect shrub of 5 or 6 feet, the branches and undersides of the leaves thinly woolly. Leaves narrow linear, rounded at the ends, or with short recurved points, the margins closely rolled back. Flower-heads small and numerous in a long loose, terminal panicle. Involucres cylindrical, often curved, not 2 lines long, straw coloured, white or brown, the bracts very thin, smooth and shining. Florets two, three, or rarely four.

A native of Victoria, New South Wales, South and Western Australia. It should be dug up before flowering, and burned.

Proclaimed for the Shire of Waranga, June 1894.

GRANT TO AGRICULTURAL SOCIETIES.

The following circular letter has been forwarded to the various Agricultural Societies throughout the State:—

Department of Agriculture,
Melbourne, 20th July, 1907.

CONDITIONS *re* GOVERNMENT GRANT TO AGRICULTURAL SOCIETIES.

SIR,—

Adverting to previous communications on the above subject, and to the circular of 1st March, 1907, setting out the conditions to be complied with, I have the honour to inform you that it has been decided to modify the conditions in the direction of making all four optional; that is, none of the conditions are to be compulsory, but any three of the four set out may be selected. Also, concerning Condition A (Examination for Soundness in Horses), it has been decided to modify the method of examination so as to allow of the examination being made concurrently with the judging of the classes, so that the condition will now read as follows:—

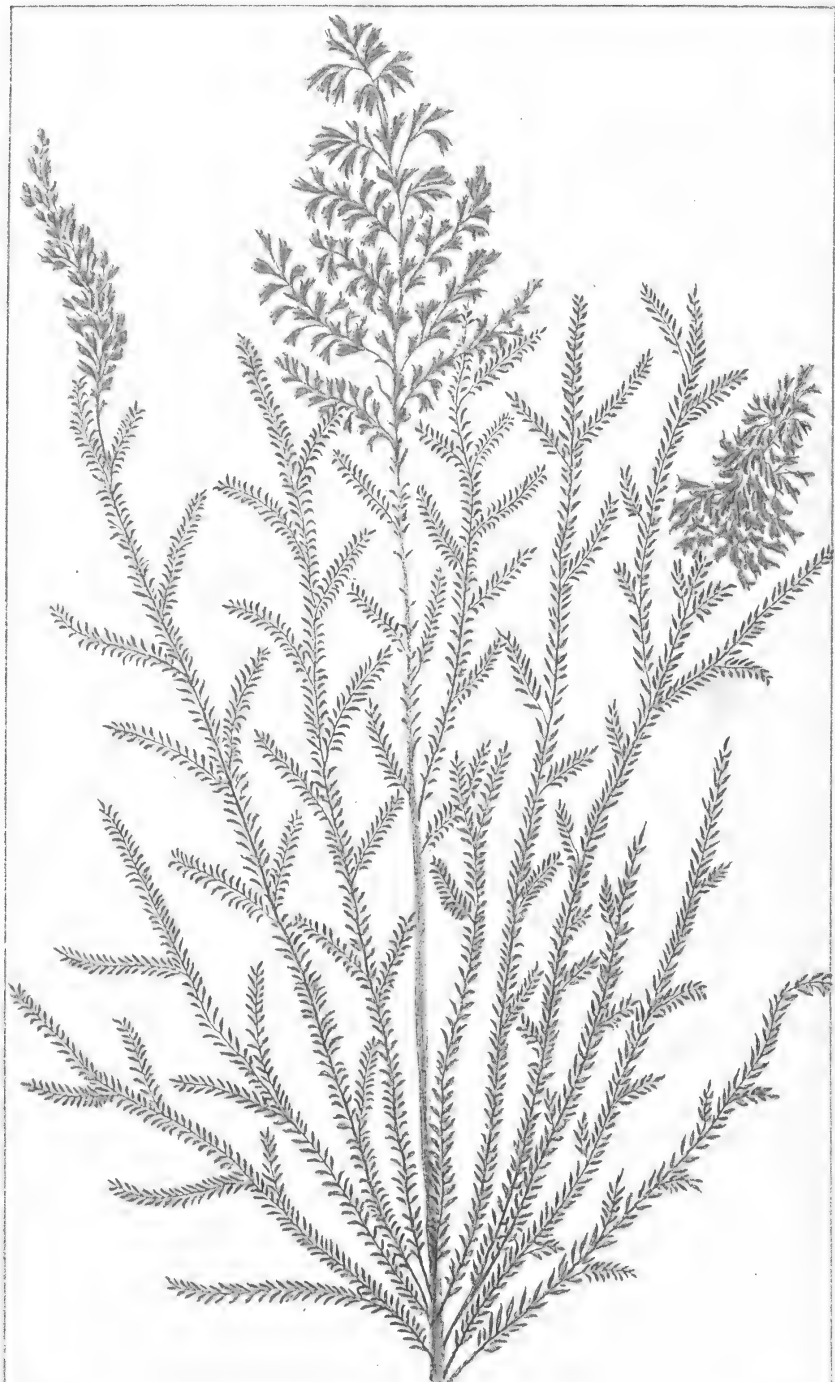
- ii. METHOD OF EXAMINATION.—The veterinary officer to be in the judging ring at the time of judging, and to act with the judge so far as the determination of the question of soundness or otherwise of any exhibit is concerned, and to make, and be given facilities for making, such examination of any exhibit as he deems necessary to arrive at such determination. The decision of the veterinary officer on the matter of the soundness of any exhibit shall be final, and no exhibit deemed by him to be unsound shall be awarded a prize.

I shall be glad if your Society will take this modification of the conditions into consideration at an early date, and let me know which three of the four options are chosen. Of course it is now competent for you to alter any previous choice made if you so desire.

I have the honour to be, &c.,

E. G. DUFFUS,
Secretary for Agriculture.

The Secretary, Agricultural Society,

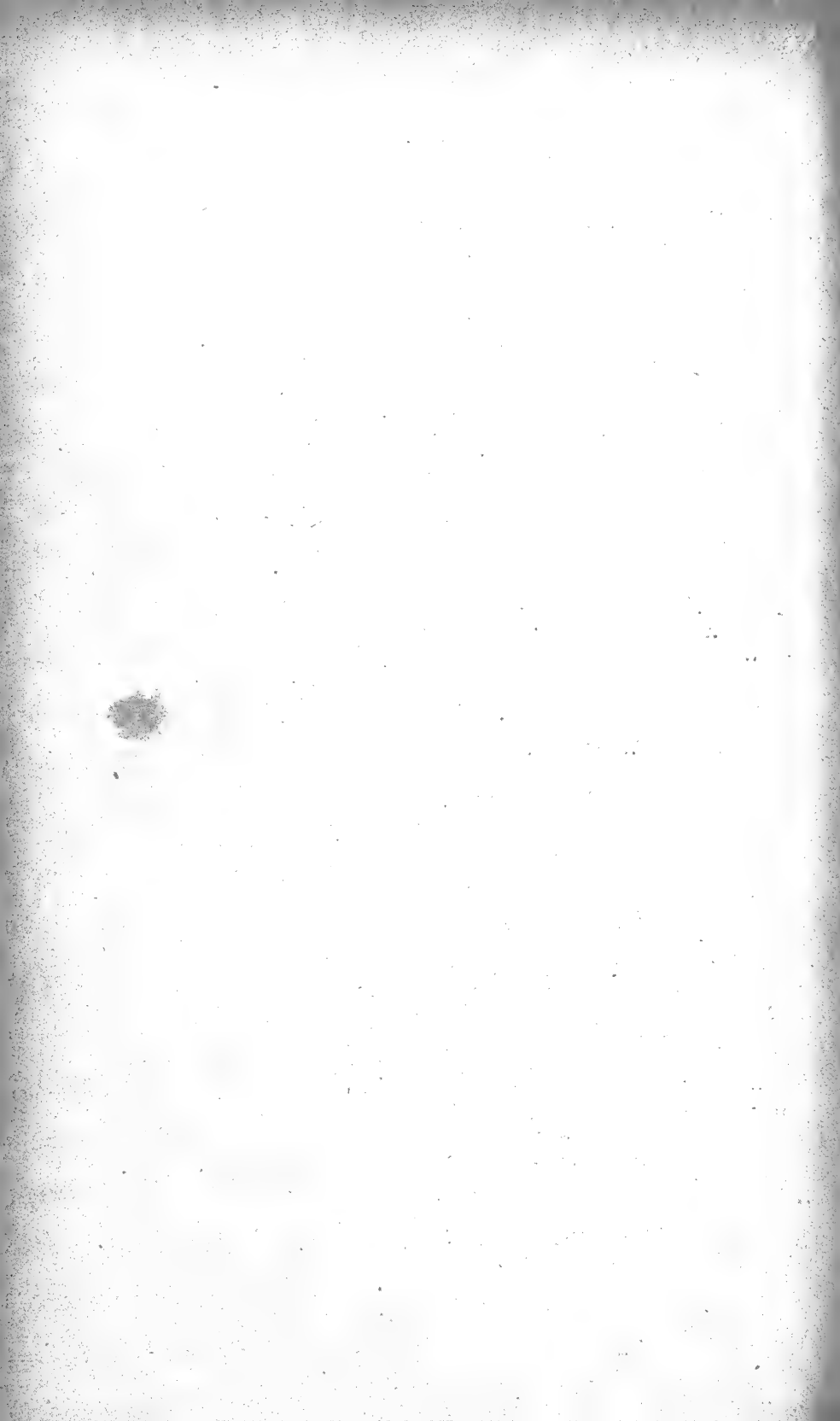


O. Wüster Del.

J. H. Torrey, Direct.

J. Knap, Acting Govt. Printer.

CHINESE SCRUB
(*Cassinia arcuata*, Rob. Brown.)



GUILDFORD GRASS, OR ONION GRASS.*

Romulea cruciata, Ker-Gawl. (*Irideæ*).

Alfred J. Ewart, 'D.Sc., Ph. D., F.L.S., Government Botanist.

This pretty little Irid, the sudden appearance of whose pink flowers in grass, turf, path borders, and similar situations in spring, draws perennial attention to it, has undoubtedly become a troublesome weed in many pastures, its somewhat grass-like leaves hiding its presence until flowering occurs. Owing to its small perennial subterranean corms, its free seeding, and its generally resistant character to extreme conditions, the eradication of the plant from land of which it has once taken possession is impossible by ordinary methods, except at a prohibitive cost. Hence I have been reluctant to advise the proclamation of the plant in spite of the frequent complaints as to the serious damage it does to pastures until it was possible to give practical methods of keeping down the weed.

Proclamation under the *Thistle Act* does not necessitate immediate eradication, since conviction may be suspended provided that the Justices are satisfied that the person affected has used and is using all reasonable exertions to destroy the plants in question. Since the methods given at the end of this article will insure the complete or almost complete suppression of the weed on agricultural land at the end of two or three years without any cost which is not represented by an increased value or yield from the land, no further objections to the proclamation exist, and its presence may be used as a lever to secure better methods of cultivation.

The following is an extract from the *Proceedings of the Royal Society of Victoria*, Vol. XIX., page 43 (1906), in regard to this plant:—

"1. This widely-spread Irid with rose-lilac flowers, and tough grass-like leaves, is commonly known as Guildford grass or Onion-grass, and was originally referred by F. von Mueller as *Romulea bulbocodium*, L. It is given in Rodway's *Flora of Tasmania* as *Trichonema roseum*, Ker., which is a synonym for *R. rosea*, a South African plant. Both the species, however, have the style longer than the stamens, whereas our plant resembles the *R. cruciata*, distinguished by Ker. Gawl. (*Botanical Magazine*, 1802, plate 575) from *R. rosea* and *R. bulbocodium*, by the style shorter than the stamens and the hairy filaments. Baker, in the *Flora Capensis*, makes this species, *R. longifolia*, Baker, but the three purple stripes on the outer perianth segments given by Baker are absent or very feebly developed, and the spathe segments are smaller ($\frac{1}{2}$ cm. long in flower to 1 cm. in fruit), the inner segment having a broad scarious margin. The leaf, as in the type specimens of *R. cruciata*, often has a fifth groove on one edge for a portion of its length. The character of the spathe segments justifies the recognition of an Australian variety of *R. cruciata*."

"There can be no doubt that the short style with its six very short stigmatic arms, which separate as the stamens shed their pollen, is an adaptation for self pollination. The flowers, which are strongly thermonastic, only open on warm sunny days and do not seem to have any regular insect visitors. The plant grew abundantly in the neighbourhood of the Botanic Gardens over 40 years ago, and may date further back still, for its increase is favoured by the conditions attendant on the presence of civilized man. Probably if specimens had been collected from the early part of last century we would have received evidence of adaptive modification on the part of this plant, but whether *R. cruciata* var. *Australis* is derived from *R. bulbocodium* or *R. rosea* is impossible to say. In any case the whole genus of *Romulea* is badly in need of revision. Experiments on the extermination of this weed are in progress at the Herbarium and in the Domain grounds. The use of pigs has been suggested to root out the corms from the ground, and

* Proclaimed under the *Thistle Act* for the whole State, August, 1907.

T. S. Hall has recorded before Field Naturalists' Club, that white cockatoos coming north from the Otways have performed the same office, and by digging out the corms have cleared patches of ground infested by the weed.

"Mr. C. French, jun., reports that he has often seen children eating the bulbs, although to the novice the taste is by no means pleasant. A quantity of the corms crushed and washed through a fine sieve yielded an abundance of fine quality starch, so that, were it not for the expense of collecting the bulbs, they might form a profitable source of starch. The seeds are also highly nutritious, and it is owing to the sparrows and other birds which eat the seeds that the plant is so rapidly and widely spread. Future investigations may show some use for the seeds. The stalk of the fruit capsule is strongly geophilous, and curves down towards the ground during ripening. In loose ground it is sometimes partially or completely covered before the seeds are shed."

To the foregoing the following accounts of the experiments on the eradication of this plant may be added. Plots of land were selected in which the weed was very abundant and uniformly distributed. These were marked out into areas one yard square. Some were treated with poisons and manures, others were cut or pulled, others mechanically treated by digging, and still others planted with other plants to see if they would suppress the weed.

Suppression by Pasture Plants.—In the hard, dry, poor soil in which *Romulea* flourishes, no good pasture plant appears able to suppress it according to field observations. Plants actually tried were Lucerne (*Medicago sativa*); Black and burred Medick (*M. lupulina*, *M. denticulata*); Birds foot Trefoil (*Lotus corniculatus*) and various clovers such as the white, red, and subterranean and strawberry clovers (*Trifolium repens*, *T. pratense*, and *T. subterraneum* and *T. fragiferum*.

Poisons and Chemical Manures.—These were applied on 16th September, 1906, i.e., before any new seedlings were established, and the final countings made in June and July, 1907. The results are well shown in the appended table:—

Substance.	Amount per Sq. Yard.	No. of Plants remaining in 1907.	Condition.
Ammonium Sulphate ...	$\frac{1}{2}$ lb.	860	Darker green
Potassium Nitrate ...	$\frac{1}{4}$ lb.	820	About normal
Untouched Plots ...	...	550-900	" "
Common Salt ...	1 lb.	320	Stunted
" ...	2 lbs.	260	Stunted, bare of other vegetation
" ...	$\frac{1}{2}$ lb.	400	Nearly normal
Sulphuric Acid ...	1 lb.	280	Stunted, and ground nearly bare
Arsenite of Soda ...	1 oz.	360	Apparently normal
" " ...	2 oz.	250	Somewhat greyish green

Evidently poisons are quite ineffective except at a prohibitive cost and in quantities which would render the ground useless for long periods of time. Nitrogenous chemical manures encourage the *Romulea* as much as they do neighbouring pasture plants.

Mechanical Methods.—To loosen the soil and pick out the corms is impossible on a large scale. The corms occur from near the surface to nearly 6 inches depth according to their age and to the character of the soil, so that it is a day's work to pick out all the corms from a square rod of badly infested ground, which equals a labour charge of over £100 per acre.

A plot was selected containing approximately 460-500 plants per square yard. One square yard was dug over and a top dressing of

1 inch of horse manure applied. After one year it contained 260 plants of *Romulea*. A second plot, dug over only, contained 320 plants. A third was dug over 12 inches deep, so that the top 6 inches were placed at the bottom, and the plants covered with at least 6 inches of soil. It contained after one year 210 plants. A similarly treated plot was covered with an inch of horse manure. It contained after one year 160 plants only.

Evidently therefore the weed can be best suppressed on pasture land by manuring, ploughing, and bringing the land under cultivation for a time. A leafy crop like potatoes is the most suitable at least for the first year, since *Romulea* loves hard, dry ground where it receives plenty of sun, and with potatoes the ground is well worked and kept open. *Romulea* develops its leaves, however, from April to October, so that to cut light from it a cold-resistant crop like winter wheat is best.

It is often curious to notice how *Romulea* follows hard tracks along roads without passing into the fields through the soft ground by the wire fences, and enters the fields through the gates where the ground is trodden hard, and the other vegetation is short. A mere wire fence under which the ground is soft and the vegetation longer than outside or inside suffices to keep the plant out of a field for a considerable time after it has travelled or been carried down a road. Loosening the soil and keeping the stock from it for a time would have the same effect in the open pasture. Mr. Cameron has suggested that stock carry the corms on their feet from place to place, and hence into the fields, but this is very unlikely, although seed might be carried in this way. The chief agents in spreading the seeds are birds, however, and the corms maintain the plant wherever it has become established without aiding in its spread.

The abundant presence of this plant on pasture land may be regarded as a sign that the pasture is in poor condition, and that the soil needs opening, loosening, and manuring. No plants with single bulbs or corms flourish under a system of rotation farming, and they only prove really serious on overstocked natural unimproved pasture land, where no provisions are taken to restore the balance of nature disturbed by the presence of the stock.

The weed, though preferring dry ground, can also stand a good deal of moisture, so that flooding land is of no avail in its extermination. In fact, of a number of corms kept under water for two months, and then air dried for two months, over 60 per cent. produced new leaves when planted. The mere encouragement of a heavy growth of grass by resting the land, by top dressing with stable manure (not chemical manures) coupled with a scarifying of the surface to loosen the soil aids greatly in keeping down the weed, and such treatment pays in results for its cost.

Treatment for Lawns and Cricket Grounds.—The tough wiry grass-like slightly channelled leaves appear above ground usually in April, and are actively assimilating food until September or October. Flowering begins usually in August, and seed are formed until October or even November. Hence the leaves must be kept closely cut all through winter, and this steadily exhausts the plant. The grass should be cut closely or mown with a machine as often as the leaves attain any length, and whenever any flowers appear. This should be done in as dry weather as possible to avoid compressing the soil by too much trampling when moist. If necessary light top dressings may be used, of short well decayed stable manure, and two years of such treatment should practically free any cricket ground or lawn from the pest, or greatly reduce it.

Paths and Roadsides.—Along the borders of paths the weed does no very great harm and forms a pleasant and pretty harbinger of spring. If seeding is prevented by cutting the flowers, or by passing a hoe through the leaves and young flower stalk, an inch or so below the ground in August or September, the plants are kept under and prevented from increasing or spreading. Along the hard borders of broad stock roads the sod should be turned by ploughing either once in July, or in May and September. It would pay in most cases to allow the neighbouring land owners to take in the useless breadth of most of these roads on condition of keeping them clean from weeds. Roadside tree planting of evergreens is also of use. *Romulea* will not grow beneath closely planted Acacias, and such planting would add greatly to the beauty and comfort of many of our bare country roads. All factors which loosen the soil, enrich it in humus and cut off light in winter time, aid in keeping down the weed. Pigs are of some use in rooting up and eating the corms, but methods of this kind are always more or less untidy and patchy ways of cleaning land.

THE PROCLAIMED PLANTS OF VICTORIA.

(Continued from page 498.)

Alfred J. Ewart, D.Sc., Ph.D., F.L.S., Government Botanist; and
J. R. Tovey, Herbarium Assistant.

St. Barnaby's Thistle.

Centaurea solstitialis, Linn. (*Compositæ*.)

A stiff, erect annual, one to two feet high, with few branches, and covered with a white cottony wool. Radical leaves pinnatifid (like a feather); upper leaves small and linear, decurrent in long, narrow wings along the stem. Flower-heads solitary at the ends of the branches, nearly globular; the innermost bracts ending in a small shining appendage; the intermediate ones in a long spreading prickle, with one or two small ones at its base; the outermost usually with only a few small, palmate prickles. Florets of a bright yellow. Fruiting heads with a soft white pappus.

An introduction from Southern Europe. It should be dug out with a hoe or mattock before the seeds mature, piled and burnt. It often flowers after cutting if fairly old and left too long.

Proclaimed for the Shire of Wodonga, April, 1899.





O. Wauer, Del.

J. R. Tovey, Drex.

J. Kemp, Acting Govt. Printer.

ST. BARNABY'S THISTLE
(*Centaurea solstitialis*, Linné.)



WHEAT JUDGING.

Mr. H. Pye, Principal of the Dookie Agricultural College, has furnished the following copy of the wheat-judging card used by students at the College :—

DOOKIE AGRICULTURAL COLLEGE, VICTORIA.

Student's Judging Card.

WHEAT.

Scale of Points.	Maximum Points.	Student's Award.			Corrected.
		1	2	3	
EDUCATIONAL.					
(Not to affect prize.—For educational purposes only.)					
Number of Exhibit					
Name of Variety					
Locality grown					
Rainfall					
Yield per acre					
Nature of Soil					
Treatment of Soil					
Rate of Seeding					
Fertilizers applied					
MARKET CONDITIONS.					
<i>Purity of seed and trueness to type—</i>					
Freedom from seeds of other varieties of wheat as may be detected by inspection or test	12				
<i>Cleanliness—</i>					
Freedom from bunt, smut, and moulds, also barley, oats, weed seeds, cavings, and dirt. Freedom from objectionable odours and weevils	12				
<i>Uniformity—</i>					
Evenness of size and plumpness. Absence of sprouted grains, also cracked grains. Soundness of germ	12				
<i>Weight per Bushel—</i>					
Grain to pour from hopper into a bushel measure until filled, allowing the same time and run for each sample; no jarring of bushel measure before the strike, otherwise grain settles down and a heavier weight per bushel is recorded	25				
<i>Uniformity of Colour—</i>					
Bright. Healthy. Somewhat translucent	9				
MILLING QUALITIES.					
<i>Apparent to the Senses—</i>					
Thin skin, grain neither too hard or too soft, more inclined to be hard. Freedom from too much moisture	10				
<i>Determined by Analysis—</i>					
Strong flour, gluten-content and quality good. Whiteness of bread	20				
Totals	100				

The points for purity of seed should be carefully considered when the grain is to be used for seed purposes, and a liberal deduction of points made if the sample be not true. In the absence of analysis the judge must rely on his experience.

Name of Student.....

Date.....

THE PROCLAIMED PLANTS OF VICTORIA.

(Continued from page 498.)

Alfred J. Ewart, D.Sc., Ph.D., F.L.S., Government Botanist; and
J. R. Tovey, Herbarium Assistant.

The Cape Weed.

Cryptostemma calendulaceum, R. Brown. (*Compositæ*.)

A tufted plant, almost stemless. Leaves in a rosette, obovate, usually segmented, three to six inches long, cottony white beneath, glabrous above. Flowers solitary on slender stalks, one to one and a-half inches diameter. Ray-florets yellow, spreading; inner ones tubular, brownish. Achenes woolly.

An introduction from South Africa. A great pest in pastures as it spreads so easily from its numerous seeds, leaving the ground quite bare on the approach of summer. It can be hoed up before flowering, dried, raked together and burnt. It may be kept under by cultivation or by giving the taller grasses free play against it, and avoiding close cropping.

Proclaimed for the Shire of Poowong and Jeetho, June, 1901.

GARDEN NOTES.

J. Cronin, Inspector, Vegetation Diseases Acts.

The Sweet Pea.

Sweet, and everlasting peas, are annual and perennial species respectively of *Lathyrus*, a genus of leguminous plants embracing many species of decorative value as garden plants. Most of the annual species are natives of South Europe and North Africa, the species from which the present garden forms of sweet peas have been raised being *Lathyrus odoratus*, a native of Sicily. This pea has been in cultivation in gardens for over two hundred years, but its popularity as a valuable garden plant is of comparatively recent date. During the last twenty years a number of horticulturists in England and America have made a special study of sweet peas, and by cross-fertilization and selection have produced varieties of great excellence, the size and form of the blooms and the varied colouring and freedom of flowering in the new varieties arousing a deal of public interest in the plants. The culture of sweet peas has become a feature in most gardens, large and small, the hardiness of the plants, wealth of bloom under fair conditions, ease of culture, and the short period elapsing between the sowing of the seeds and the blooming season being the principal factors in their popularity. The flowers are produced in spring in Victoria, and embrace almost all shades of colour; the plants thrive under harsh conditions, but like most florists' flowers respond well to a little attention in the selection of site, soil and manure, and cultivation.

The everlasting peas—so styled on account of their perennial habit of growth—have been found native in various parts of Europe, Asia, and



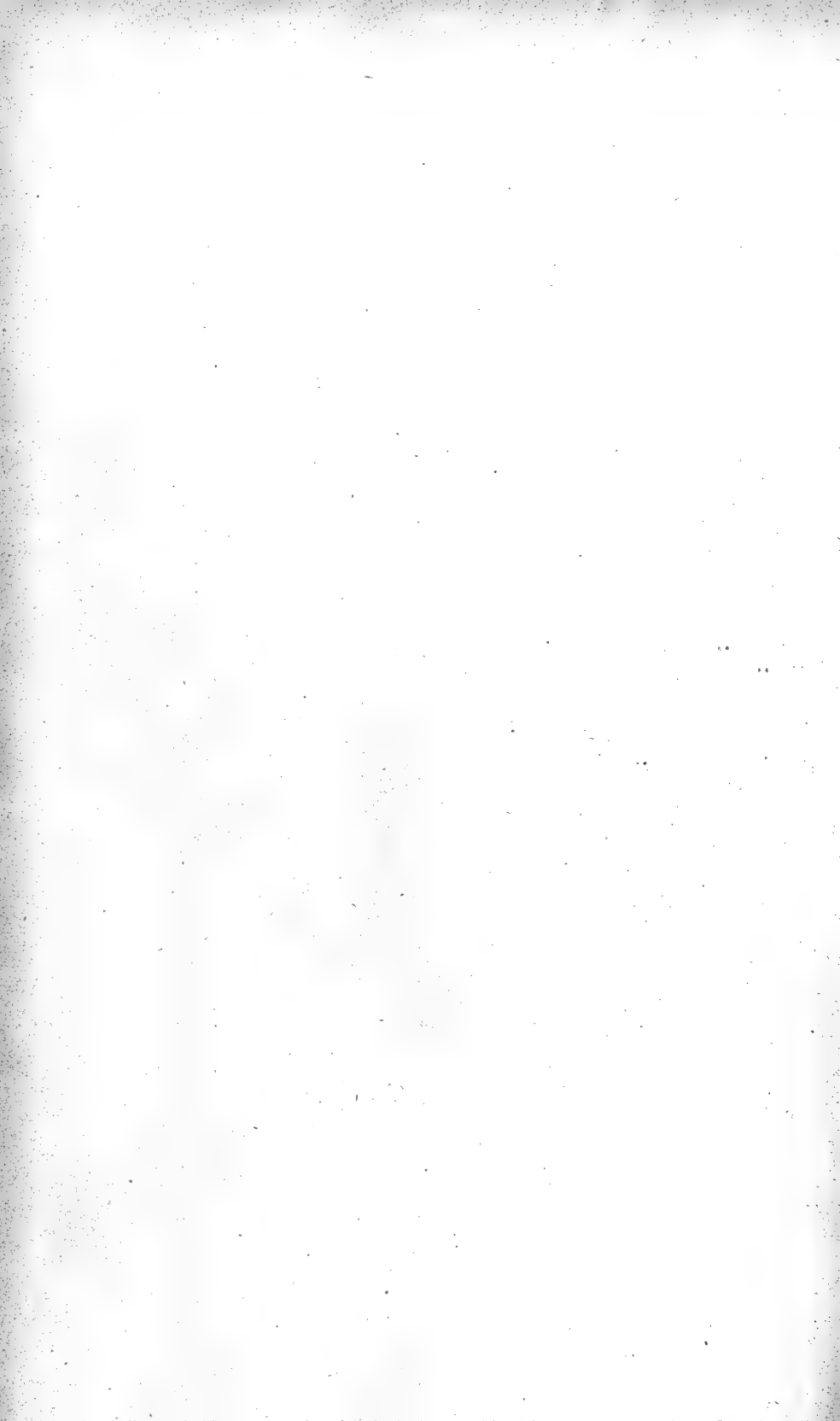
O. Wauer, Del.

J. E. Torrey, Dux.

J. Kemp, Acting Gov. Printer.

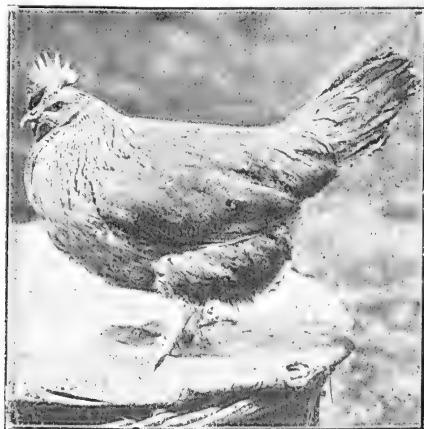
CAPE WEED

(*Cryptostemma calendulacium*, Rob. Brown.)



centre and no amount of selection changes it with the other colours of the body; but the narrower the stripe the lighter is the colour of the neck. As the feathers approach the head the smaller the stripe, till the head feathers are all silvery white, and this is best without a tinge of brown towards the throat. The neck should be well arched, the full feathering sitting well over the shoulder. As in all Dorkings the eyes are red, or to be strictly correct, the colour is a deep orange or light red.

Body should be deep, long and broad; breast salmon colour, blending to grey on the sides. The term salmon colour, or salmon red, is often misunderstood; salmon colour is a reddish pink, softened on the Dorking breast with the least tinge of grey in it which gives it a subdued shade. The deep red of some hens is too dark for silver grey hens; that was the colour of the old "Grey Dorking" before the Silver Greys were bred. Too light or faint colours are also defective. A good, rich, soft, salmon colour, with as little light shafting and edging as possible, and



SILVER DORKING HEN.

Age 3 years 9 months. Record 615 Eggs.

entirely free from dark spots, or tip feathers, is the handsomest breast. A good evenly coloured breast is a point of great desirability in a Silver Grey Dorking hen. This colour is not found in any other breed of fowls, except Game and then it is seldom as rich. For the sake of getting light backs and necks, the breast colour is often overlooked or under-estimated in the Show pen. Many hens and pullets are awarded prizes on account of their backs, while their breasts are poor in colour. The breast colour should be more regarded, as it is a distinctive Dorking feature.

We now come to the colour of the back of the Silver Grey hen, which gives the name to the breed. It is not a solid colour, but when looking at it closely we see a very fine mottling of deep grey and light grey. On examining a feather we find it is made up of very fine etchings, short wavy lines and fine longish dots, neither round spots nor straight lines. Some term it pencilling, but pencilling is more applied to fine lines on the edges of feathers. This mottling is very beautiful and is seen in some species of wild birds especially game birds, but in none purer than in the Silver Dorking. The light and dark are about equal in quantity; when the dark predominates the colour

is defective. The shafts of the feathers are light, but the less conspicuous the better. Very few birds are seen without the light shafting; yet there is a possibility of breeding out the light shafts, so that the back would resemble a piece of broken steel at the fracture. There is reason to believe that this result can be brought about, as we have seen in Partridge Cochins, which once had light shafts to a great degree, but still no other quality should be sacrificed for the absence of shaft colour. I have seen small, inferior birds awarded first prize over large ones with good backs, fine in all other respects.

Many birds have lighter or darker tips to the feathers, which mar the even steel colour. A shade of brown or drab often appears, and in the latter part of summer most backs incline that way in the old faded feathers before moulting; but come out bright and clean in new feathers—under part of body and fluff are grey. There is a tendency on the shoulder and upper wing coverts to have a reddish tinge. This is a persistent feature of this breed and it should be avoided in the Show pen and bred out as much as possible at all times; it is gradually disappearing, but is a decided bore to breeders of Show birds. The wings should be closely folded and carried well up. Coverts and bow, silver grey with white centre lines. Primaries and secondaries, upper webs brown, lower webs slaty, mottled with grey. The tail of fair size to match the body colour, and carried in a fairly elevated position. The large feathers are grey on the outsides, dark brown on the insides. Thighs strong, also grey in colour. Legs white, and the fifth toe must be perfect in form and development. It will be seen that a bird with such fine colouring, form and size, is not one to be overlooked, for added to all this, it is a bird of fine carriage, graceful movement and symmetrical proportions.

THE PROCLAIMED PLANTS OF VICTORIA.

(Continued from page 606.)

Alfred J. Ewart, D.Sc., Ph.D., F.L.S., Government Botanist; and
J. R. Tovey, Herbarium Assistant.

The Ragwort.

Senecio Jacobaea, Linn. (Compositæ.)

An almost cosmopolitan herb with a root-stock short and thick without creeping shoots. Stem two to four feet high, erect, scarcely branched, except at the top. Leaves divided into ovate, obovate, or narrow segments, coarsely toothed or again divided, the terminal segments large and joined together, the lower ones smaller and distinct, sometimes with a loose woolly down, especially on the under-side. Flower-heads rather large, of a bright yellow, in a handsome, compact terminal corymb. Involucral bracts tipped with black, the outer ones few and very small. Florets of the ray from twelve to fifteen, linear-oblong, and spreading. The seed-like fruits of the disk are covered with short hairs, those of the ray with none. A native of Europe and Asia.

Having a perennial root-stock, the Ragwort is difficult to eradicate; care must be taken to remove the root-stock from the soil, otherwise the plant will grow again. Since it seeds freely, and the seeds are easily carried by the wind, it should be destroyed before flowering.

Proclaimed for the Shires of Phillip Island and Woolamai, Wooryal, Poowong and Jeetho, South Gippsland, Mirboo, and Colac.



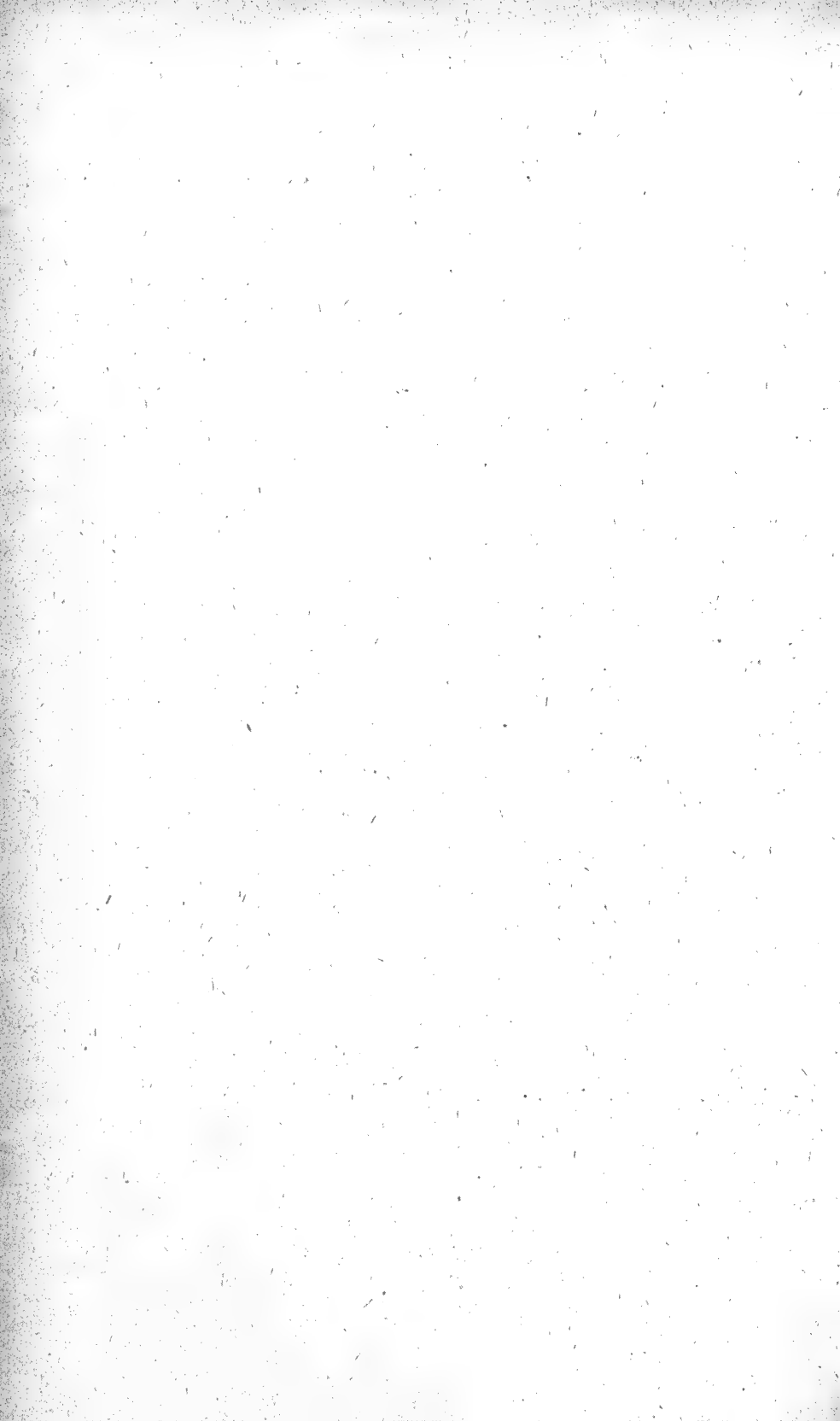
Waller.

JPT. J. D. H. S.

Flora of England & Wales.

RAGWORT

(*Senecio jacobaea*, Linne)



notify in writing what action an orchardist must take. If the trees are not cleaned within a certain time the inspector can employ some one to do the work and recover the cost from the owner. In Los Angeles a large sum is expended in inspection, and over 9,000 orange trees were fumigated this season by the inspectors. The system of the County Horticultural Commissioners is very irregular in its administration, as many of them hardly do any inspection. The Lieutenant-Governor in Sacramento told me that he was going to bring in a Bill to make every fruit producing county pay an Entomologist to act as inspector and adviser to the Horticultural Commissioner.

On the following Monday accompanied by Mr. Jeffrey I went out by electric tram to Govina, where we met Inspector Bemish and drove all day through the orange groves of the San Gabriel Valley which contains about 8,000 acres of citrus orchards. We found a considerable amount of red and yellow scale upon old trees, but as the greater part of all these orchards had been fumigated during the last year they were generally very clean. The whole of this valley is irrigated by water from the adjacent mountains. The walnut orchards of Santa Barbara were visited next day on my way back by the coast road, and I reached San Francisco next day at 2 o'clock in the morning. My last expedition was to Santa Rosa northwards with Mr. Koebele round the orchards of that district where purple scale was said to be killed by a parasite. We sent our cards into Mr. Burbank, but did not see that gentleman. I also visited Paulo Alto to see Mr. Kellogg, the Professor of Entomology at Leland Stanford University, and obtained his opinions on entomological work in California, and saw the working of his office.

The observations made during my three weeks' investigations among the insect pests of the orchards as to the value of parasites, and the opinions of the leading men interested in the industry, all point to the same conclusions, namely, that in spite of the money and work that have been expended during the last twenty years in the State of California upon the introduction and propagation of foreign parasitic insects to destroy scale and other injurious insects, with one or two exceptions, they have very little commercial value, for unless they are effective enough to render the work of spraying and fumigation unnecessary they might as well not exist.

I have found all the orchards and garden pests (with the exception of fruit flies) quite as abundant and destructive in California as in Australia, and wherever the orchards are neglected they suffer in the same manner. Even with the drastic powers held by the officers of the State Board of Horticulture the orchards have to be cleaned by spraying and fumigating. In Los Angeles wherever one goes he finds fumigating tents. At Watsonville there are a dozen steam sprayers and many smaller outfits spraying for codlin moth; a large factory is established at Bernecia which does nothing else but turn out a liquid form of lime and sulphur wash, called "Rex," used for spraying San Jose scale. The small green chalcid wasp (*Scutellista cyanea*) introduced from South Africa through Mr. Lounsbury to destroy brown scale, though it has to a great extent cleared off this cosmopolitan scale from the pepper trees and other ornamental garden trees, has made little or no difference to olive scale in the orchards. All the orange trees in the parks and side walks are covered with red scale, smut and aphis, and yet one can see many small native parasitic wasps crawling about on the leaves among the scale of which they have no doubt destroyed a certain percentage.

The contention that where parasites were introduced, it would not be necessary to take any mechanical methods to destroy insect pests, is certainly not borne out by the present conditions of orcharding and orchards in California. There is no question that the native, and not the introduced chalcid wasps parasites, are doing as much work in devouring the percentage of scale insects that are their natural food, but as for either native or introduced parasites exterminating a pest when once it is firmly established, it has never happened yet. In Mr. Carne's list of the *Coccidae* of California, he enumerates about 135 species a 100 of which are more or less thoroughly established in California, and a dozen of which are serious orchard pests.

There is one curious thing in connexion with the *Aspidiotus auranti*, the red scale of orange common both to Australia and California, and that is that here they claim there is a second species that is known as yellow scale (*Aspidiotus citrinus*) which is never found upon the stems or young wood, but only upon the fruit and foliage, and thus it never does the injury to the trees that the true red scale can in killing back the young wood. The only difference that I can find is in the colour and flatness of the disc of some of the scale upon the foliage.

The codlin moth parasite, as previously pointed out, in spite of Mr. Compere's accounts of its work, and the offer of a colony by the State Board of Horticulture to several of our States for £1,000 each, has done nothing outside the office insectarium.

In conclusion I have to thank Professor Woodworth of Berkeley College for arranging and accompanying me on country visits, the officers of the State Board of Horticulture at San Francisco, Messrs. Elehoun, Bremner, and Cairns, for a great deal of valuable information, Mr. Isaacs of Sacramento, who showed me round his district, and the County Horticultural Commissioners whom I met in different districts.

THE PROCLAIMED PLANTS OF VICTORIA.

(Continued from page 680.)

Alfred J. Ewart, D.Sc., Ph.D., F.L.S., Government Botanist; and
J. R. Tovey, Herbarium Assistant.

The African Box-thorn.

Lycium horridum, Thunberg, *Solanaceæ*.

A shrub growing to a height of twelve feet. Stem, stiff, much branched; branches, grey, ending in a spine; leaves, obovate, fleshy, glabrous, in tufts of three to seven, flat above, convex beneath. Flowers, single on a short stalk. Corolla white, or tinged with purple. Fruit, a berry, globe-shaped, orange-red.

This spring hedge-plant is very variable in height, and being perennial, is difficult to eradicate. It should be dug up before flowering and burnt.

An introduction from South Africa.

Proclaimed for the whole State, April, 1907.



O. Walter, del.

J. F. Dwyer, sculp.

J. R. S. de la Cruz, sculp.

AFRICAN BOXTHORN.
(*Lycium horridum*, Thunberg.)

for this purpose anywhere in France or Switzerland. On one vineyard where raffia was employed I was informed that this was only because the stock of last year's rye straw had been destroyed by fire. I think this material could with advantage be used for tying up vines in Victoria. In Switzerland this straw is imported from parts of France where rye is cultivated. This year its market value was £5 12s. a ton.

GARDEN HERBS.

J. Cronin, Inspector, Vegetation Diseases Acts.

Plants embraced in the general terms of "pot herbs" and "sweet" herbs, are those whose foliage contains some aromatic principle useful in and incidental to cookery, the most important being perennial and herbaceous plants of easy cultivation. A few annual kinds are grown occasionally, but the herbs generally cultivated for home and market are sage, thyme, mint, savory, marjoram, and hyssop. The first-named is the most popular and generally grown. Large quantities of herbs are produced by market gardeners, several of whom devote most of their time and area to the cultivation of the plants. At all seasons of the year there is a demand for the produce. In spring and summer the herbs are sold in a fresh condition, while at other periods dry herbs only are available.

In market gardens herbs are usually grown in a portion specially reserved for their culture, a plan to be generally recommended even in very small gardens, as the plants occupy a given position for several years as a rule, and should be considered as outside of the rotation and ordinary culture of vegetable crops. A limited area well prepared and tended will produce a quantity of foliage of good quality sufficient for an ordinary household, while with a much greater quantity of plants scattered about the garden, more or less neglected, a shortage often occurs. It is generally understood that coarse growth is undesirable, the aromatic qualities peculiar to the various plants being present in a lesser degree in gross growths and leaves than those cut from steadily grown and well matured plants. Sufficient root-room, plant food and moisture should be provided to allow a full development of the plants.

The best plan to adopt for home gardens is to select a piece of ground of a size according to requirements, and devote it to herb culture. A narrow border alongside a fence or path is generally found suitable, but it must not be beside a hedge, or large trees, or the plants will suffer unless well manured and watered during summer. In many gardens the herb ground is tended as carefully as any other portion, and is usually neat and attractive, the plants being set out in rows and neatly trimmed as required, well cultivated and often margined with parsley or thyme. A few minutes' hoeing occasionally, or a mulch of manure is sufficient to keep most of the plants in steady growth, and a thorough soaking with water during exceptionally dry weather followed by cultivation when the surface is drying will insure a plentiful supply for the whole year in either a fresh or dried condition.

Thyme and Sage.—Thyme and sage are dwarf shrubs and are propagated from divisions of the old plants, cuttings, or seeds. As a rule the plants are divided and replanted every third year, the central portions being discarded and the outer and most vigorous shoots with roots attached being selected for replanting. Cuttings of firm shoots

inserted in sandy soil in autumn root readily, but do not produce as much foliage for cutting as divisions during the first season. Autumn is the proper season for dividing and replanting. Sage is often raised from seeds when the plants have become enfeebled by excessive cutting. The seeds germinate freely and a fresh stock of plants may be raised with little trouble. The seeds may be sown in autumn or spring, the former for preference. The young plants bear transplanting well, and may be removed at any time except mid-summer and mid-winter, without injury. The seedlings should be allowed to grow without cutting of foliage during the first year. Mature plants may be cut several times in the season; a general cutting for drying for winter use is best done when the flowering shoots are showing. Excepting when wanted for seed-saving purposes, herbs grown for foliage should not be allowed to bloom. In all cases a few leaves should be allowed to remain on each shoot or branch when the plants are being cut in summer.

Hyssop.—Hyssop is almost identical in its needs with sage.

Mint, Marjoram, and Savory.—The herbaceous plants, mint, marjoram, and savory, are best planted adjacent, as they require slightly different treatment at times to the shrubs. The shoots of these die to the ground in winter, the roots remaining alive. They are propagated from divisions of the roots in autumn or from seeds. Mint is generally increased from divisions and requires a cooler and moister soil than the other herbs. It is a perfect weed in some places—a weed being defined as “a plant out of place”—while in dry hot situations it is often a matter of difficulty to establish it. In such places a liberal quantity of cow manure should be added to the soil and the plants mulched and watered until thoroughly established. Shoots should be cut and dried as they approach the flowering stage.

Sweet Marjoram and Sweet Savory are annuals and require to be sown annually. They should be sown in rows in spring and thinned to allow sufficient room for the plants to develop.

THE PROCLAIMED PLANTS OF VICTORIA.

(Continued from page 720, Vol. V.)

Alfred J. Ewart, D.Sc., Ph.D., F.L.S., Government Botanist; and
J. R. Tovey, Herbarium Assistant.

Apple of Sodom.

Solanum sodomæum, Linn. (*Solanacæ*.)

A spreading or diffuse shrub or herb of one to three feet. Foliage green, but sprinkled as well as the branches with a few small star-shaped hairs. Prickles stout often thickened downwards on the stem and leaves, more slender on the calyces. Leaves deeply pinnatifid, with very blunt rounded, obovate, or spatulate, lobes, often wavy; the whole leaf three to six inches long. Flowers in small clusters on short and simple rarely once forked stems. Calyx divided to the middle into blunt lobes. Berries globular, rather large, variegated green and white, or finally yellow.

An introduction from Africa. Sometimes wrongly called Kangaroo Apple. It is a most obnoxious weed undoubtedly poisonous, and should be pulled up before the fruits mature, piled and burnt.

Proclaimed for the whole State, February, 1907.



APPLE OF SODOM
(*Solanum sodomaeum*, Linné)

by our Stock Branch. The Biographical Survey deals with investigations as to the spread and range of useful and injurious birds and animals. In the absence of Dr. Merriman, Dr. Fisher took me through the offices and explained the trouble that they had in the north-west with the ground-squirrels, which destroy grass and crops, just like our rabbits. Poisoning with phosphorus or other mixtures is the chief method of extermination; but it has been stated that a few years ago a contagious disease sprang up amongst them, and in some places they all died out. Dr. Piper has been investigating this matter. The Bureau of Forestry was also visited, and the officers in that branch gave me much interesting information about their methods of dealing with the forest areas. Most of the United States forests are in the west and north-west, and consist chiefly of conifers. Replanting is not practised on a large scale, but the forests belonging to the Government are waste lands, much of them in the free-range districts. The free-range system has grown up into one of the greatest evils to settlement in the States. There are millions of acres for which the State gets no rent in the occupation of sheep and cattle men, who are eating out the grass and fighting among themselves to hold the land of which none of them have any right or title.

The Weather Bureau is also closely connected with the Department of Agriculture, as they issue warnings as to rain or frost indications that are carefully watched by fruit-growers, farmers, and others interested in agriculture. They issue two weather-charts every day. The observations are taken all over the States, from Edmonton in the far north of Canada to Porto Rico in the West Indies, and at 10.30 the same morning all these reports are tabulated and ready for publication.

Last week, 7th October, I went to Ithaca and visited Cornell University as one of the most typical agricultural colleges in the United States, where Professor Comstock showed me all their work, and the arrangement of specimens for their teaching work. Professor Slingerland showed me his methods of making lantern-slides and other work. Dr. Needham took me down to his marsh lands experiments, where all water insects, mosquitoes, and fish can be continuously observed under natural conditions, and the reclamation of marsh lands studied.

From there I went to Boston to study the work of the Gipsy Moth and Brown Tail Moth Commission. The State Commissioners have a force of 1,000 men engaged burning off underbrush, burning egg clusters, bandaging the trunks, and spraying the foliage of the infested forests. The State of Massachusetts votes part of the money, and each town in the infested districts has to tax itself so much per valuation of property, and at the same time the Federal Department has voted a sum to deal with the introduction of parasitic enemies of these moths in their native home (Europe), and thousands of such parasites are being liberated in these infested areas. The result of these parasites will be watched by the economic entomologists all over the world. I went over about 200 miles of the infested area with the State Commissioner. I have now arranged to leave on the 15th (next Tuesday) for Texas, where the Cotton Boll Weevil Commission is working, and after a few days' stay in the district of Dallas will proceed to the City of Mexico, *viâ* San Antonio, to investigate the Mexican Fruit-fly (*Trypeta ludens*) and its parasites, and, if feasible, shall forward consignments of infested pupæ direct to our Entomological Branch.

THE PROCLAIMED PLANTS OF VICTORIA.

(Continued from page 26.)

Alfred J. Ewart, D.Sc., Ph.D.; F.L.S., Government Botanist; and
J. R. Tovey, Herbarium Assistant.

Common Horehound.

Marrubium vulgare, Linn. (Labiatae.)

Stem rather thick, a foot and a half high, or more, with spreading branches, thickly covered with a white cottony wool. Leaves stalked, orbicular, soft, and much wrinkled. Flowers in dense whorls or clusters in the axils of the upper-leaves, small, of a dirty white. Calyx with ten small, hooked teeth. Upper lip of the corolla narrow, erect, and 2 cleft.

A native of Europe, Asia, and Africa.

An extract of this perennial odorous herb, is commonly used as a cough medicine. The flowers afford to bees nectar for a pale excellent honey, which is however not palatable to all tastes. In many countries the plant becomes a weed, and takes possession of large patches of pasture land, thus preventing the growth of more useful vegetation. It should be dug up before flowering, and the short stout root stock destroyed by quick lime or burning. Ploughing and summer fallows soon suppress it.

Proclaimed for the Shires of Maldon and Warrnambool.

AGRICULTURAL EDUCATION.

EXAMINATION RESULTS, FARMERS' CLASSES, 1907.

(Continued from page 49.)

H. V. Hawkins, Superintending Officer.

MILDURA.

Student's Name.	Colebatch.	Archer.	Paterson.	Hawkins.	Total.	Percentage.
Gair, C. . .	79	95	50	90	314	78.5
Chapman, F. . .	83	94	60	75	312	78.0
Beverley, E. P. . .	62	96	60	75	293	73.2
Voullaire, R. M. . .	82	97	45	65	289	72.2
Adams, F. J. . .	85	94	40	60	279	69.7
McPherson, — . . .	97	98	..	..	195	48.7
Downing, W. H. . .	87	93	..	..	180	45.0
Scott, L. . .	..	..	40	75	115	28.7
Garnett, S. W. . .	..	..	50	50	100	25.0

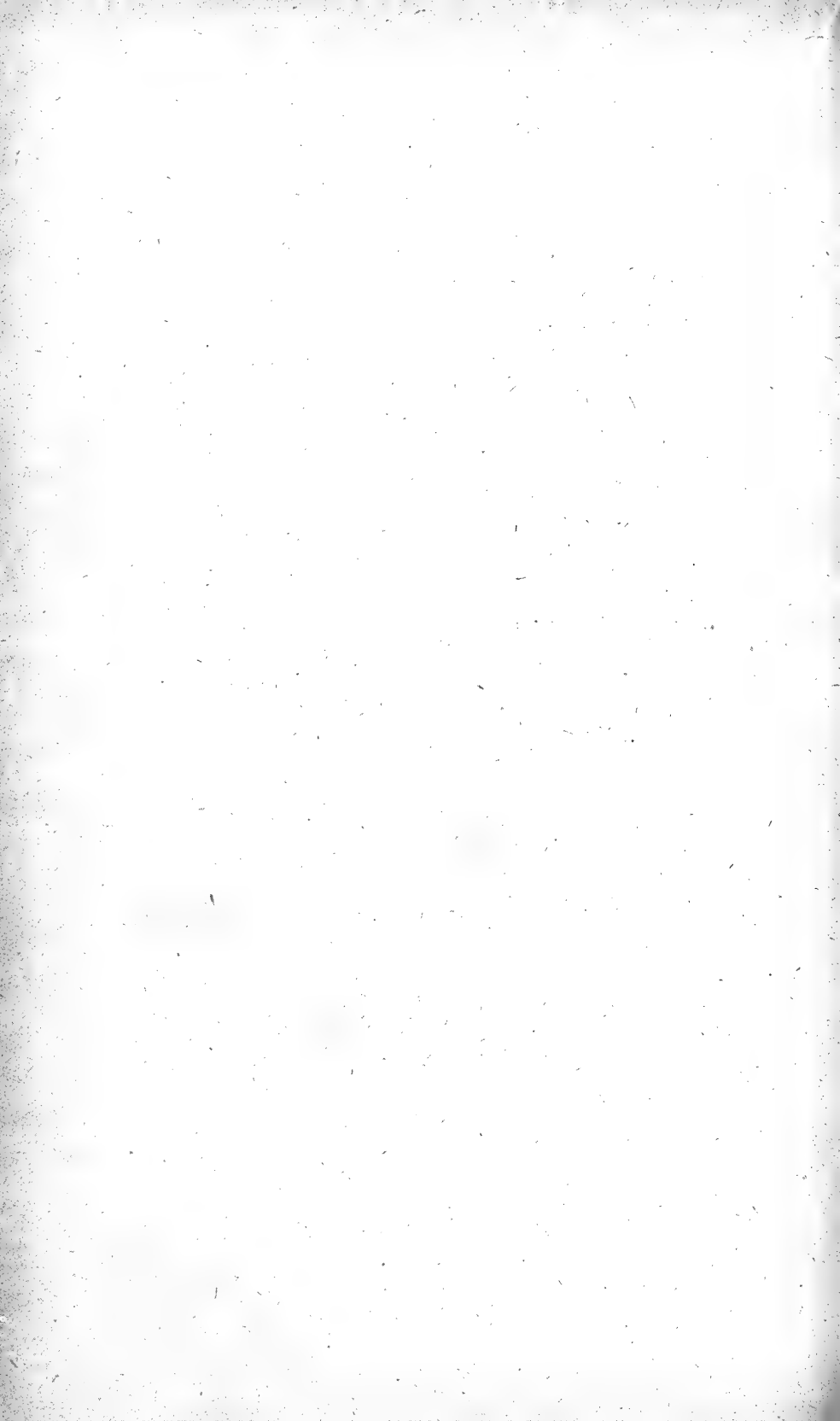
PENSHURST.

Student's Name.	Colebatch.	Archer.	Paterson.	Hale.	Total.	Percentage.
Farmer, W. W. . .	90	93	55	73	311	77.1
Linton, A. S. . .	18	71	50	75	214	53.5
Eales, E. T. . .	..	95	50	63	208	52.0
Mahony, J. . .	..	85	52	..	137	34.2



COMMON HOREHOUND.

Marrubium vulgare, Linn.



case the cultivator, in addition to a thorough preparation and manuring of the soil, supplies some rapid acting fertilizer to assist in the development of the plants, while the trade grower is content to depend on the initial preparation. The use of manures in a liquid form is popular with growers of florists' flowers, and the results are usually satisfactory when the grower becomes acquainted with the needs of the plants and the particular form of stimulant required. The most common cause of failure to produce maximum results is in the strength of the manure used and the frequency of its application. Weak solutions of such manures as nitrate of soda or sulphate of ammonia will be found to greatly benefit the plants, while strong solutions will inevitably destroy the tender feeding roots. The manures mentioned are in general use among Chrysanthemum growers, and should not be used at a stronger rate than one ounce to four or five gallons of water, or more frequently than say once a week.

Spring blooming herbaceous plants should now be divided and replanted in well prepared soil. The plants root readily after being divided and make good progress before the soil becomes cold. The divisions will require to be supplied with water during dry weather until fairly started into growth. Seeds of annuals that will endure frost may be sown for transplanting. Plants that would rarely be injured in the coastal districts by frost are often destroyed in other parts of the State, so that in many instances the plants described as hardy annuals fail to justify the description. A local knowledge of the kinds that will thrive during winter is valuable in making a selection.

Kitchen Garden.

During favourable weather celery, cabbage, and cauliflower plants should be set out. Cool moist weather is most suitable for the work of transplanting generally. Sufficient water should be applied to each plant to settle the soil thoroughly.

Ground should be prepared for future planting as it becomes vacant, and seeds of saladings and other vegetables appropriate to the season and requirements sown.



THE PROCLAIMED PLANTS OF VICTORIA.

(Continued from page 80.)

Alfred J. Ewart, D.Sc., Ph.D., F.L.S., Government Botanist; and
J. R. Tovey, Herbarium Assistant.

Paterson's Curse, or Purple Bugloss.

Echium violaceum, Linn. *Boraginæ*.

An annual or biennial; stem 1 to 3 feet high, erect or ascending, diffusely branched. Radical leaves lanceolate, stalked, the stem-leaves spreading obtuse, cordate and sometimes dilated at the base. Flowers showy, dark blue-purple, in numerous one-sided spikes, forming a long terminal curved panicle, corolla often an inch long; the narrow part of the tube very short, spreading into a broad campanulate throat, with a very oblique limb, the lower lobes rather longer than the longest stamens.

An introduction from Southern Europe. It is not injurious to stock, and is considered to be a very fair pasture plant in its young state, but when the plant matures, the flower-stalk is very rough and hairy, so that stock do not touch it, and when it seeds and dies off, all the grass is killed underneath, hence the ground is left quite bare. It should be hoed up before it seeds, piled and burnt.

Proclaimed for the Shires of Towong (1904) and Maldon (1908).

THIRD PROGRESS REPORT ON VITICULTURE IN EUROPE.

F. de Castella.

Viticulture in Portugal.

I have the honour to report as follows on the result of my inquiries in Portugal. I arrived at Oporto, from London, on 30th September. After a couple of days, lost through my being laid up with a severe attack of influenza, I presented the letters I had brought with me from London to the different wine firms at Villa Nova de Gaia, the suburb just across the river and outside the "Octroi" boundary of Oporto, where the wine merchants have their lodges or armazens. Villa Nova is the centre of the Port Wine trade of the world. I was very well received and invited to visit numerous vineyards in the Alto Douro by the merchants to whom I had introductions, who either own vineyards there, or who make arrangements with owners for the purchase of their crop. Mr. Grant, British Consul at Oporto, also gave me much valuable assistance.

I then proceeded to the Alto Douro, the true "Port" country situated some 50 miles up the Douro from Oporto, near which town no Port is made. I spent a fortnight in the Alto Douro during which time



O. Walter, del.

A. J. Ewart, Duxer

J. Kemp, Acting Govt. Printer

PATERSON'S CURSE.
(*Echium violaceum*, Linné.)

longer, for, apart from the cooling action of a windy day on them, the ewe lambs would at times urinate as soon as the iron was placed on the tail, and so cool it. A much heavier iron was made; at first a wooden handle was attached, but, as this gradually got burnt, an iron handle was turned on it. It did not matter whether an open fire or an oil drum was used; a bucket of water was kept near, in which the handle could be cooled.

The heavy iron was too thick, and held too much heat. It burnt the anus of the wether lambs, and the entrance to the genital organs of the ewe lambs, which, in the latter case, could be noticed in after years; and was thought to make more difficult the service of the ram. For general purposes, an iron, three-quarters of an inch in thickness, is therefore better. A handy size is two and a-half inches wide, and two inches deep, with the cutting-edge sloped V-shaped, equally on both sides, from a blunt edge to an inch up; the handle should be sixteen inches over all.

The man holding the lamb can do a lot towards preventing the burning. When a man has been used to holding for the knife he will lean the lamb forward, for, as soon as the tail is off, he merely lets go, and the lamb drops over the fence, but with the iron in use the lamb should be held leaning backwards. There is more in holding lambs for the iron than for the knife. The iron can be leaned slightly away from the lamb as well—there is no excuse for burning them. There are several handy ways of using three-quarter-inch boards to go between the iron and the lamb. There are careful and very neat ways of doing the work, and they are in use mostly with owners not bound to time in getting flocks out of the yards. Some owners have one side of the iron made with a bulged surface, so that in going through it presses more against the veins. This iron needs careful handling; as each tail is treated the operator must see that the right side is to the lamb, and that the latter is not burnt.

Some owners are doing good work with an instrument made like a very large pair of scissors. The patented machines also do good work, but with the farmer the plain iron is mostly used. It is either home-made or made by the local blacksmith, and when an iron handle is turned on it, will last a lifetime.

In late spring and early summer, and in autumn, flies are troublesome, and the knife is then the best, but, as a rule, there are not many lambs at those times to tail. When tailing with the knife, it comes natural to pull on the tail, but if a little time is taken, the habit can be acquired of holding the tail loosely. After the customary glance at the lamb to form an idea of age, and consequently the likely distance of the joints apart, the thumb is run over to find the joint. Then, instead of pulling the loose skin towards the operator, push it towards the lamb, and when placing the knife on, keep it just a little to the operator's side of the joint, and also press slightly towards the lamb. By so doing it will be found that when the tail is off, the loose skin, that has been pushed towards the lamb, will come back over the end of the tail where severed, cover the two veins, and check the flow of blood.

THE PROCLAIMED PLANTS OF VICTORIA.

(Continued from page 176.)

Alfred J. Ewart, D.Sc., Ph.D., F.L.S., Government Botanist; and
J. R. Tovey, Herbarium Assistant.

The Onion Weed.

Asphodelus fistulosus, Linn. *Liliaceæ*.

Root fibrous; leaves many in a dense basal rosette, awl shaped, grooved, hollow, about a foot long tapering to the apex. Flowering stem, hollow, branching, 1 to 2 feet long. Flowers small, white, or pale pink in loose clusters.

An introduction from Southern Europe. This onion-like plant is a very injurious weed. It has made its appearance in several places, suppressing almost all other vegetation. It should be dug up before flowering, and burned with the aid of brushwood, or mixed with quicklime. Ploughing, root-crops, and summer fallowing keep it under.

Proclaimed for the Shires of Bellarine, South Barwon, Port Fairy, and Queenscliff.

CHEESE EXHIBITS AT THE A.N.A. EXHIBITION, 1908.

Judges.—J. G. McMillan, N.D.D. (*Cheese Expert, Department of Agriculture*) and A. W. Woodard (*J. and J. Lonsdale and Co., Limited*), *late Cheese Expert, Canadian Department of Agriculture*.

The second display of cheese in connexion with the above exhibition took place in January and February. The total entries were 150, as compared with 90 last year. This year there were three extra classes, and the manner in which cheesemakers responded was gratifying. The greatest falling off was in the export class, there only being 16 entries as compared with 25 in 1907. The decrease of entries in this class is to be deplored. Good prizes were given, but even that seems to be insufficient to get dairymen to display an enthusiasm in the development of an export trade; the most pessimistic will admit that such development is essential, but they are not unselfish enough to exploit the market themselves. The pioneering is left to a few who by their energy and pluck relieve the market on this side, resulting in a rise of prices to those who retain all their products on the local market. To again enumerate the advantages of export is superfluous, as the benefits to be derived have been quoted frequently in the *Journal* and other publications.

The specifications for the various classes were as follow:—

Class G.—1 ton export cheese, not more than 3 months old.

Class H.—300 lbs. cheese, not less than 6 weeks old, nor under 40 lbs. weight.

Class J.—112 lbs. loaf cheese, any age, not over 12 lbs. each.

Class K.—4 loaf-size cheeses, not under 6 weeks old, nor more than 12 lbs. each.

Class L (Surprise Class).—4 40-lb. cheeses, to be taken at random.

Class M (Surprise Class).—4 loaf cheeses, not more than 12 lbs. each, to be taken at random.

PLATE 23.



O. Wauer, Del.

J. R. Torrey, Dir.

J. Kemp, Acting Gov. Printer

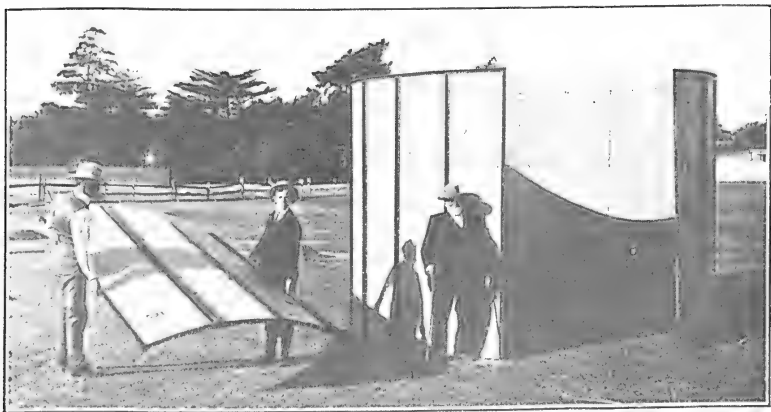
ONION WEED.

(*Asphodelus fistulosus*, Linne')

A PORTABLE SILO.

E. A. Ryland, Silo Supervisor.

Seeing that the modern method of conserving succulent fodder by means of the silo is a question in which all stock owners are vitally interested, perhaps a brief description of a simple and useful invention in the way of a silo will be appreciated by the readers of the *Journal*. The silo under review is manufactured by Mr. A. H. Russell, of 276 City Road, South Melbourne, and is made entirely of iron, in circular sections 9 feet high by 6 feet in width. These are of a convenient size for two men to handle, and are made up of three sheets (6 feet by 3 feet) of 24 gauge galvanised iron securely jointed by double folding or lapping. The outside studs or supports, of which there are three to a section, are $1\frac{1}{2}$ x $\frac{3}{8}$ steel angle iron. To these the galvanised iron is securely rivetted by strong rivets placed at intervals of $8\frac{1}{2}$ inches apart.



LOWER HALF OF SILO SHOWING SECTION.

The circular shape is kept by two angle irons running horizontally, one at the top and one at the bottom of the section. They are bored with $\frac{3}{8}$ inch holes on the flat so that the bottom section may be secured by spiking or bolting to sleepers or blocks in the ground, and by this means the silo can be made a permanent fixture if so required. The second section is secured by simply bolting it to the bottom section by means of the band of angle iron. The capacity of the silo is increased or decreased by the number of sections used, according to the quantity of fodder to be conserved.

The iron studs are conveniently bored to allow of the silo being stayed when empty, by means of wire guys; the studs also admit of a ladder being fitted to the side for access to the portholes. The joints between the sections are packed by a strip of steam packing material, and thus the whole silo when erected becomes practically airtight. The portholes are made one to each six feet in height, the same distance apart as in the silos built by the Department of Agriculture. The doors, constructed of the same material as the wall, are attached outside by bolts and nuts, three on each side bolted to the iron stud.

The internal surface of the iron may be easily preserved by coating with a thick lime wash composed of lime and skim milk, the milk being used in the same way as water in ordinary whitewash. The alkaline properties of lime neutralize the acids produced in the fermentation of the green fodder and prevent its action in corroding the iron. An iron silo coated in this way will, with reasonable care, keep bright and clean and will last for many seasons. The outside should be protected with a coating of tar. The following are some of the advantages of this type of silo:—

Durability.—When protected as above it is practically indestructible. Being made entirely of iron there is no danger from white ants, fire, rotting or warping of timber, &c., and it will also be vermin proof.

Portability.—It can be moved from paddock to paddock by means of horses and dray, the sections when packed making about a two-horse load. Oftentimes it would be a great saving of time and labour for a farmer to move his plant and silo to the crop rather than bring the crop to it.

Future Enlargement.—The silo can be enlarged in diameter or height by simply erecting more sections.

As a storage cylinder for grain or chaff the silo described would be found very suitable.

THE PROCLAIMED PLANTS OF VICTORIA.

(Continued from page 208.)

Alfred J. Ewart, D.Sc., Ph.D., F.L.S., Government Botanist; and
J. R. Tovey, Herbarium Assistant.

Treacle Mustard.

Erysimum repandum, L. (Cruciferae).

A tall erect herb; stem much branched at the top; leaves narrow, lance-shaped, with somewhat toothed edges; stem and leaves bearing more or less scattered forked hairs. Flowers yellow, clustered in elongated terminal racemes; stigma seated on the top of the ovary. Pods spreading, hardly thicker than the short stalks; seeds oblong, rust-colored.

A smaller variety exists with a simple unbranched stem, about 6 inches high, but the ordinary form may attain a height of 2 feet or more in good soil. In poor dry soil it may develop as an annual, though under less severe conditions it usually lasts for two years, or even longer if the conditions are very favorable and the formation of seeds not abundant. Strongly flowering and seeding plants usually exhaust themselves and then die, but the seeds are very abundant, and some may remain living in the soil at least three years, and possibly longer.

On permanent pastures, cutting and the prevention of flowering and seeding will keep the plant under. In cultivated ground a bare fallow or a crop of potatoes will help to clean the ground, if the seedlings are killed as they appear, and given no chance to establish themselves. Care should be taken that no seed is sown which contains the seeds of this plant. They can be recognised by their oblong shape and reddish color, and are about the size of ordinary mustard seed.

This plant has been wrongly called "Wild Mustard," which name applies to the "Charlock," *Brassica sinapistrum*, Boiss.

It is a native of Southern Europe.

Proclaimed for the Shire of Wimmera, December, 1900.



O. Womer, Del.

A. J. Ewart, Drawn

J. Kemp, Acquiring Co. & Printer.

TREACLE MUSTARD.

(*Erysimum repandum*, Linné)

1 A complete plant. 2 An enlarged pod

IMMUNITY.—Whenever a cell, a protein, or a ferment, foreign to the body, enters the blood, it provokes the formation of a neutralizing or antagonistic substance. The exact site of origin of these substances is not fully understood, one school regarding the white cells as the sole source, another school asserting that the tissues affected by the foreign substance supply the antibody. These antagonistic substances are of various sorts and can be briefly enumerated as follows:—

1. Foreign proteins excite the formation of *precipitins*, which when mixed with the exciting protein produce precipitates. Thus if white of egg is injected several times into a rabbit the blood of this animal will contain a precipitin which can readily be demonstrated by mixing egg white with the rabbit's serum. These precipitins like all the other antibodies are fairly specific. For instance the precipitin evoked by the albumen of a hen's egg will give a well defined precipitate with the white of a hen's egg but none or hardly any with the white of a duck's egg. The proteins of man's blood will excite in the same way a precipitin which reacts best with a protein derived from a man or anthropoid ape.
2. Enzymes excite the formation of *antienzymes*. Even the digestive ferments in the alimentary canal of an animal provoke in the same animal the formation of antitrypsin, &c., which fact partly explains why these digestive ferments act only on the food and not on the lining walls of the gut.
3. The toxins which bacteria produce and which can gain admittance to the general circulation, giving rise to various disturbances, excite the formation of *antitoxins* which neutralise these bacterial products.
4. Foreign cells, including bacteria and foreign blood corpuscles, excite the formation of a number of antagonistic bodies—
 - (a) *Agglutinins*, which cause the foreign cells to clump together.
 - (b) *Opsonins* which so act upon bacteria, &c., that these latter are readily devoured by white cells.
 - (c) *Cytotoxins* which break up the cell-wall and cause disintegration of the cell. Thus the red corpuscles of a sheep, injected into a rabbit, will be followed by the formation in the rabbit of a substance which destroys the envelope of the red corpuscles of the sheep and acts only in a feeble manner on the red corpuscles of other animals.

When an animal acquires a disease and, after its recovery, is no longer liable to contract the same disease, as occurs, for instance, with typhoid fever in man and distemper in dogs, the immunity acquired is explained by assuming that these antibodies, formed during the disease, remain in the circulation and effectually prevent each new invasion from making any headway. No substances simpler than the proteins or the enzymes appear capable of exciting the formation of antibodies; thus *ricin*, the poisonous protein of castor-oil seeds, causes the production of antiricin, but alkaloids such as morphia or strychnine or other and simpler substances cannot act in this way.

The total amount of blood in the body is about one-fifteenth to one-twentieth of the total weight of the animal.

The specific gravity of the blood is about 1056, that is to say 1056 volumes of pure water would weigh the same as 1000 volumes of blood.

The reaction of the blood is that of pure water, namely, neutral.

The freezing point of blood also remains wonderfully constant, namely 0.56 C. below that of water for mammalian blood.

THE PROCLAIMED PLANTS OF VICTORIA.

(Continued from page 272.)

Alfred J. Ewart, D.Sc., Ph.D., F.L.S., Government Botanist; and
J. R. Tovey, Herbarium Assistant.

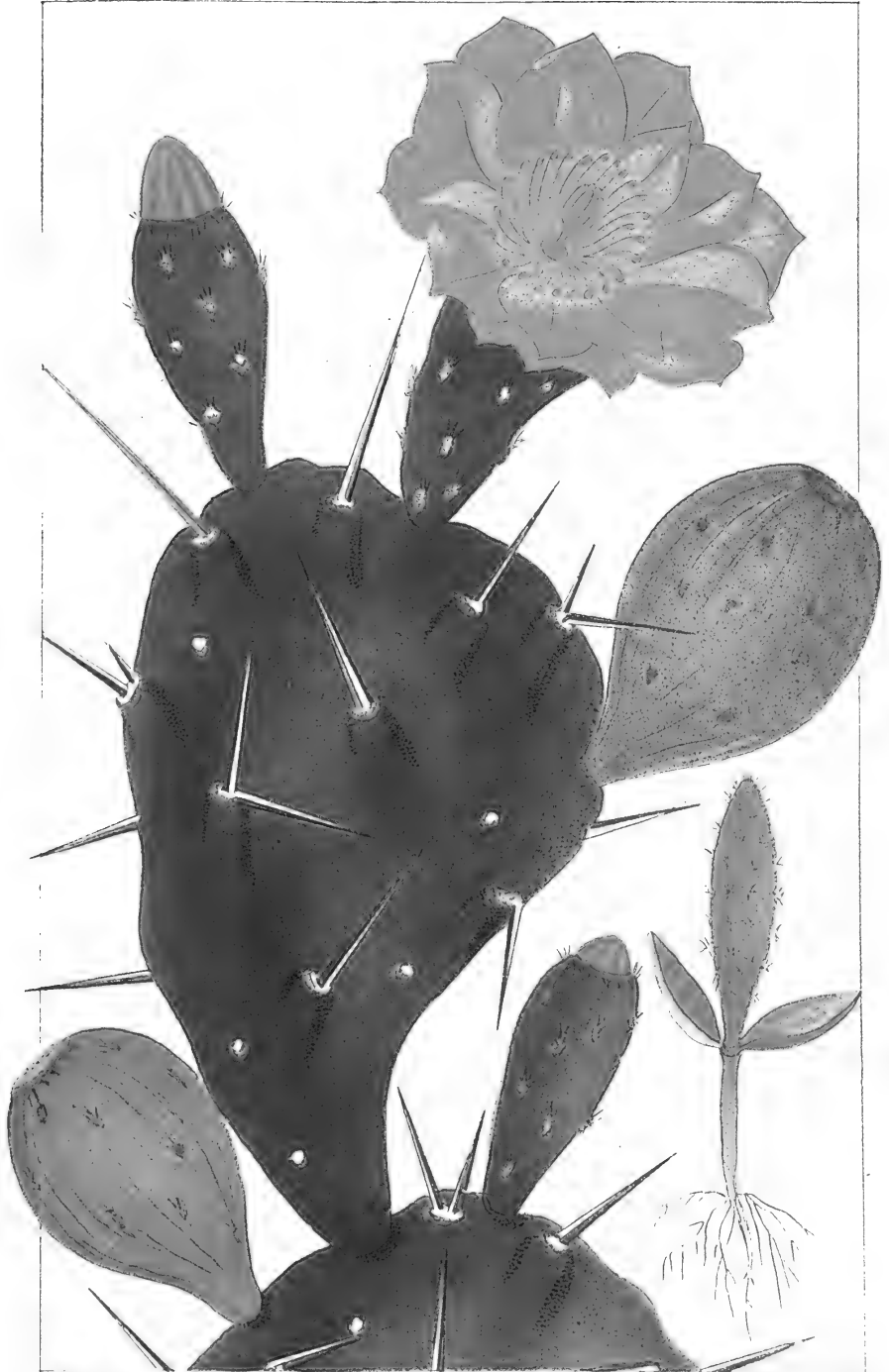
The Drooping or Common Prickly Pear.

Opuntia monacantha, Haw.

The spines of the Drooping or Common Prickly Pear are mostly single, but often in pairs, and then frequently sharply bent at their bases, so that one or both diverge widely. Occasionally more than two large spines occur together. The spines arise from more or less prominent cushions, which often bear bundles of minute hair-like spines, especially well shown on the fruits. The joints are obovate-oblong, often a foot long, usually distinctly stalked, the whole plant 3 to exceptionally over 12 feet in height but usually 5 to 8 feet. The flowers are yellow, the outer petals reddish, the fruits pear-shaped and clustered on the usually more or less drooping ends of branches. Every joint will strike root under favorable conditions, and both the ripe and unripe fruits will do the same. The joints may remain alive several months after cutting. They can be destroyed by boiling, and may then be fed to stock if care is taken to see that the spines, especially the smaller ones, have come away. It is not, however, good food, being too bulky and watery. Otherwise it can be buried in pits and covered with soil, or piled in heaps and covered with quick lime. In South Africa spraying with arsenite of soda is recommended ($2\frac{1}{2}$ to 4 per cent. solution), but this is costly (probably £3 to £5 per acre in Victoria), and the plants need to be burnt off as soon as they have dried and before new shoots appear. Spraying the standing plants with dilute sulphuric acid in calm, dry weather is also fairly effective but less so than cutting.

This plant appears to be increasing in Victoria, and is spreading along the railways around the shores of Port Phillip Bay, where it is likely to prove a great nuisance or even danger if unchecked. The plant would without doubt do great harm in the Mallee district if allowed to spread there. Several other less common species grow in Australia, and an account of them has been given by Maiden in the *Agricultural Gazette for New South Wales*, Vol. IX., p. 1002, 1899.

Proclaimed for the whole State, February, 1907.



Thomson

A. J. Ewart

Chas. A. Smith

DROOPING PRICKLY PEAR.

(*Opuntia monacantha*, Haw.)



selection which necessarily follows and has to be continued for several years, that requires time and attention. And the results of crossing, too, are rendered much more certain from a better understanding of the principles underlying it, so that hybridizing is no longer what Lindley considered it, "A game of chance played between man and plants."

The improvement of our grain crops is thus seen to be a work involving careful and systematic effort, directed along definite lines, and from its very nature must be continuous. If the finest plants are selected from suitable varieties, the largest ears chosen and the seed graded so that only the best grain is sown, the average yield could be increased by this means alone. New varieties also require to be produced by cross-breeding, not merely to give us strains with the weaker characters eliminated and as many of the best characters as possible incorporated, but in which such serious diseases as rust and smut have been got rid of by breeding from an immune parent.

Though careful and systematic work in cross breeding and seed selection will give us, in the course of time, cereals with an increased yielding capacity, full advantage of the improvements will not be obtained unless accompanied by a higher standard of farming. In the hands of the careless, a rust-resisting or smut-proof wheat, or indeed any improved seed, would in a few years cease to be pure and soon sink to the level of the general average of the varieties now in cultivation. Just as the introduction of the binder and the harvester has necessitated increased mechanical skill in the farm worker to utilize their possibilities to the full, so also these new or improved varieties will demand better cultural methods on the part of the general run of our farmers. Hearty co-operation between the experimentalist and the farmer is the only sure way to ultimate success.

JOURNAL OF AGRICULTURE, VOLUME I.

The Department is at present unable to supply full sets of the parts forming Volume I. of the *Journal of Agriculture*. These were issued gratis to producers and as it is probable that some of the recipients may have no further use for them the Editor would be pleased to receive any available copies of Parts 1 to 7, published in 1902, from January to July inclusive. Returns should be addressed to The Editor, Department of Agriculture, Melbourne.

THE PROCLAIMED PLANTS OF VICTORIA.

(Continued from page 352.)

Alfred J. Ewart, D. Sc., Ph. D., F.L.S., Government Botanist; and
J. R. Tovey, Herbarium Assistant.

The Hemlock.

Conium maculatum, L.

The Hemlock is a native of Europe and Asia. It is a poisonous plant whose leaves emit a peculiar mouse-like smell when rubbed. The Fools' Parsley (*Æthusa cynapium*, L.) has a similar disagreeable smell, but it is a smaller annual plant a foot or two high, with bright green leaves, and the bracts beneath the flower clusters bent downwards, which is unusual in Umbelliferae. In the Hemlock there are also usually three bracts beneath each flower cluster but they are turned towards the outside of the cluster and not bent downwards. It is an erect annual or biennial often over 5 feet high, with large much divided leaves and ten to fifteen rayed compound terminal umbels, each main umbel with a variable number of green bracts at its base. The fruit (b and c) is flattened and has five ribs on each side.

The Hemlock is a common garden escape found in waste places and fields in several parts and it has been widely grown in gardens as the carrot or parsley fern. It recently was responsible for the poisoning of a number of cows at Warrnambool and also for the death of a child at Chines. Fortunately its smell usually repels stock and children but the plant is highly poisonous owing to the presence of the poisonous alkaloïd coniin most abundant in the seeds but also present in the leaves and stem. Goats appear to be largely immune to the action of the poison and will graze on it when hungry.

Fools' Parsley is less poisonous but still dangerous when present among fodder. Being an annual it is easily suppressed by preventing the formation of seeds, by cutting, hoeing or cultivation. The same applies to the Hemlock, although its eradication is more difficult, since it may last for two years. On waste ground it is best pulled up, piled and burnt and the ground if possible kept covered with other vegetation to prevent it becoming re-established. On cultivated ground it gives no trouble, though apt to spread along hedges, the borders of fields, the banks of streams, &c. Here, cutting it down should be done, and the seed in the soil, being short lived, will soon be exhausted.

Proclaimed for the whole State.

PIG BREEDING IN VICTORIA.

W. Smith, Pig Expert.

The fact that we are fully 20,000 pigs short this year induces me to bring under the notice of the farmers the importance of breeding more pigs of the right sort. My lectures throughout the State during the past year have been well attended, but I now wish to use the *Journal* as a means of reaching those who were unable to be present when I visited the various districts. For several months past the prices ruling in Melbourne markets



O. Wasser, del.

A. J. Ewart, Dirr.

J. Kemp, Govt. Printer.

HEMLOCK.

(*Conium maculatum*, L.)

Prices are fixed once a week by the Malaga Raisin Exchange. They vary enormously according to quality, as will be seen from the following list of average prices per 22-lb. case during the 1905 season:—

Imperial	Extra Imperial Clusters	120 to 150 pesetas	= 96s. to 120s.
Imperial Bajo	Imperial	112 pesetas	= 89s. 6d.
Royau		90 "	= 72s.
Royau Bajo		78 "	= 62s. 5d.
Cuarta Bajo	Choicest	56 "	= 44s. 10d.
Quinta	Choice	48 "	= 38s. 5d.
Quinta Bajo		44 "	= 35s. 2d.
Mejor Alto	Best Layers	38 "	= 30s. 5d.
Mejor Bajo	Ordinary Layers	32 "	= 25s. 7d.

Much up-to-date information concerning the Malaga raisin trade is to be found in the valuable report of M. M. Minangoin & Couston—*Les Raisins Secs en Tunisie*—published by the Tunis Government for the guidance of growers in the Regency. I am indebted to it for the prices quoted above.

This great variation in quality and therefore in price is an excellent proof of the unique nature of the Malaga raisin industry. These high grade dessert raisins are luxuries only to be produced in perfection by the exercise of much care and skill, and under the exceptional climatic conditions obtaining in that district.

SHIPMENT OF FRESH GRAPES.

Considerable quantities of fresh grapes are shipped from Malaga in barrels packed in cork dust. They are grown in several villages in the vicinity, such as Alhaurin and Coin, whence they are conveyed to Malaga for shipment.

Though the varieties grown and methods of culture are similar to those in vogue at Almeria, which district will be the subject of my next Report, it is as well to here note the different behaviour of such a stock as A.R.G.I. when grafted with the Ohanez or Almeria grape and trained on a high trellis. Under these circumstances, the growth of suckers and failure of the graft, which growers of the short pruned Gordo complain of, no longer occurs. This vigorous stock seems to find an outlet for its surplus energy in the ample overhead training necessary to insure the fruiting of this scion and for this as well as for several other strong growers, A.R.G.I. is considered an excellent stock.

The training of the vines differs sometimes from that usual near Almeria, where the horizontal overhead trellis or *Para* is the rule. Several growers near Malaga have tried growing the Ohanez on erect trellises, such as those we use for the Zante currant. They claim to be obtaining satisfactory results with less initial expenditure than that necessary to establish the elaborate overhead system.

Other matters in connexion with the shipment of fresh grapes can best be described in connexion with the Almeria Industry.

In closing this brief description of the Malaga district I must thank several of those to whom I am indebted for assistance and information. From Mr. John G. Haggard and Mr. Thornton, H.B.M. Consul and Vice-Consul respectively, I received most valuable assistance. To Don Leopoldo de Salas y Amat, I am indebted for much valuable information and kind help. His reports, as chief of the "Comission Anti Filoxerica" in the Province of Malaga, were of great use to me. To Mr. Frederick Eaton, Dr. Visick, Don Enrique Nagel, Señor Molino de la Vega and Mr. Johannes Fr. Nölting I wish to also tender my sincere thanks.

¹ In reducing the above prices to English standard the value of the peseta is taken at par, viz., 25 pesetas to the £1.

THE PROCLAIMED PLANTS OF VICTORIA.

(Continued from page 416.)

Alfred J. Ewart, D. Sc., Ph. D., F.L.S., Government Botanist; and
J. R. Tovey, Herbarium Assistant.

The Stinking Mayweed or Fetid Chamomile.

Anthemis cotula. L.

The stinking Mayweed or fetid Chamomile is a native of Europe, Asia, and Africa. It is common on roadsides, waste places, and if allowed to seed freely is apt to spread into pastures and cornfields and become troublesome. It is especially abundant along many stock roads, where travelling stock continually eat off the pasture plants and so give them no chance to keep down the Mayweed. The plant is obnoxious to stock on account of its unpleasant flavour, and if eaten by them in time of scarcity is apt to give their flesh, milk or butter an unpleasant flavour.

The plant is an annual, a foot or more in height, with glandular dots and one or more daisy-like heads on long furrowed stalks, but dwarfed on dry exposed roadsides and waste places. There are a few linear pointed scales between the minute flowers on each head; the latter lengthens out during flowering, and the leaves are much divided, especially the lower ones. Ray florets white and with no style, inner bracts of the head with scaly tips, seed-like fruits rough with glandular dots. It seeds freely but is easily kept under by ploughing and cleanly cultivation, encouraging the seeds to germinate and then destroying the seedlings by working the soil. The stouter pasture grasses, clovers and trefóils, will keep it down on pasture land if not grazed too closely. Infested stock roads should be narrowed to the breadth of the paved track and the sides ploughed and cultivated alternately. It would pay in most cases to allow the land-holder to take in the wasted border on condition of cleaning it and keeping it clean.

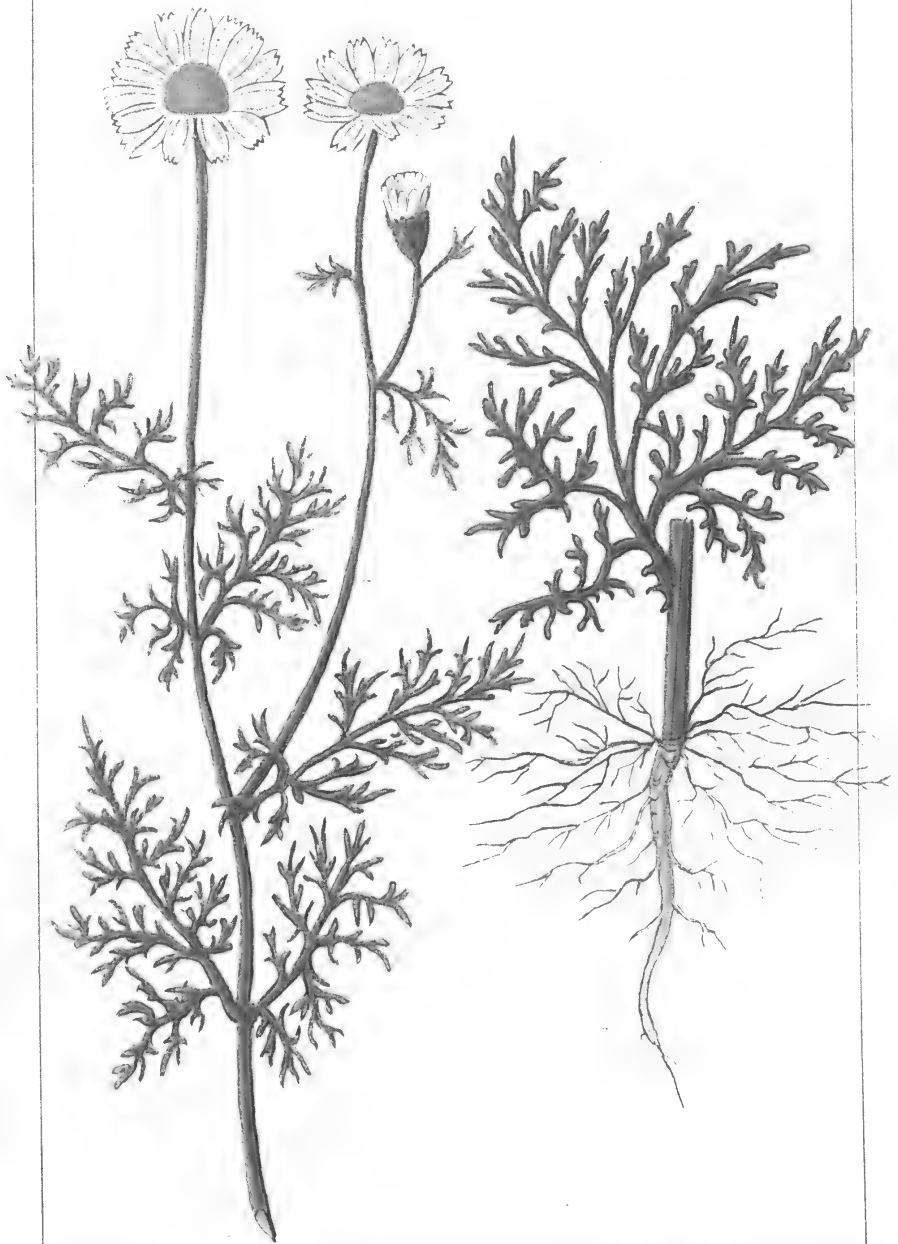
Proclaimed for the Shires of Maldon and Orbost.

A SUGGESTION FOR WEED SUPPRESSION.

Alfred J. Ewart, D.Sc., Ph.D., F.L.S., Government Botanist.

At some recent prosecutions under the Thistle Act at Leongatha the Police Magistrate, Mr. G. Read Murphy, offered a series of prizes to the children bringing the largest numbers of Ragwort, a plant with which the district is infested, to the Head Teacher of the local State school. As the result, the Head Teacher writes to say that so far 19,943 plants of ragwort have been brought to him and that over 12,000 were brought in during the first four days. Apparently the idea has been very successful, and the children have for the time being cleared the district, more or less, of plants of ragwort of appreciable size.

There can be no doubt that the same idea might be extended to other districts infested by proclaimed weeds with great effect, although it seems hardly fair to throw a new burden on the already heavily laden shoulders of the local teachers. If the fines obtained as the result of prosecutions were devoted in some suitable fashion as rewards for their destruction, the good done by the Thistle Act would be greatly increased,



O. Wauer, Del.

A. J. Ewart, Dires.

J. Kemp, Govt. Printer

STINKING MAY WEED OR FETID CHAMOMILE.

(*Anthemis cotula*, L.)

and an order authorizing police magistrates to devote the fines inflicted to that purpose would be of great value. The money would then be retained and utilized in the district affected, where it is usually most needed, instead of being lost to it.

The good effects of utilizing the services of the children in the manner above indicated are twofold. In the first place every one who has had anything to do with children and with plants knows how strong the natural destructive tendency of children is, and how much damage it can cause when uncontrolled. By directing this destructive tendency into proper channels we give their natural faculties full play and divert them from the useful shrubs, trees, birds, nests and the like on which they might otherwise be exercised. After a time the child should come to regard certain plants as he does snakes, *i.e.*, as something to be destroyed on sight. When he comes to man's estate and has land of his own, proclaimed plants will not be likely to thrive upon it. It is from an educational point of view, and by inculcating the spirit that certain plants, like certain animals, are natural though insidious enemies of man, that the idea of offering rewards to school children for their destruction is likely to prove of most use.

Nevertheless in France, and in other countries also, the services of children have been largely utilized to keep down or suppress plant or animal pests, and the direct good effects of children scouring the highways and byways for weeds are not to be under estimated. It is along roadsides that the problem of weed suppression is most difficult, and it is also along the roads that weeds spread most readily from one district to another. I have estimated that a plant of ragwort allowed to flower freely in a newly cleared district may, under favorable conditions, succeed in establishing 500 offspring besides being itself perennial. The 20,000 plants of ragwort collected and destroyed by the school children in a short time at Leongatha, and at an unfavorable period of the year, represent a potential 10,000,000 plants in the following season. Fair sized plants of ragwort run about 10 to the lb. when thoroughly dried, so that 10,000,000 plants represent not far short of 500 tons of organic matter which, in the form of sheep or mutton, would be of considerable value, instead of a dead loss to the district.

INSECT PESTS IN FOREIGN LANDS.

(Continued from page 279.)

SIXTH PROGRESS REPORT BY MR. W. W. FROGGATT, F.L.S., F.E.S.

Constantinople, 29th April, 1908.

I herewith furnish a brief report upon my work in England and while crossing through Europe to this place. As soon as I arrived in London I called upon the respective Agents-General of the States I am representing. I then presented my credentials to the Chief of the Entomological Staff, who took me round and introduced me to all the officers of the Zoological Department, and placed all their immense collections of material at my disposal. Here I spent all the spare time at my disposal going through the *Diptera* with Mr. Austen to see all their species of fruit flies, and though the Economic branch was discontinued last year,

I obtained a great deal of valuable information from the officers and the examination of the collections in their charge.

I visited the Zoological Museum at Cambridge University, where Dr. David Sharp is in charge, and spent a day going through the collections which contain many Australian specimens, and noting the methods adopted in the mounting and preservation of the museum specimens. Later on, I visited Oxford University. Here are deposited the very extensive Hope and Westwood collections containing the types of many Australian insects of economic importance, among them a collection of scale insects, probably the first made of these obscure and then little known insect pests. The collection of *Diptera* contained many specimens of fruit flies, some of great interest, such as several of Mediterranean fruit flies captured in London, and noted in Westwood's handwriting in 1840. At the invitation of Mr. G. H. Verrall, of Sussex Lodge, Newmarket, who has the Bigot and Meigen collections of *Diptera* in his great collection, I spent two days at his place examining these collections, where also there are many Australian types, and established the habitat of a number of *Dacus* and other fruit flies in Cairo, India, Africa and the Malay Islands, and found specimens of *Ceratitis catoirai*, closely allied to *C. capitata* species, but I think is a distinct species; it is only recorded from Mauritius and the Island of Bourbon.

At the invitation of the Hon. C. N. Rothschild (who is the greatest authority on that important group of insects—the Fleas), I spent a very interesting day with the Director (Dr. Jordan) at the Tring Museum at Tring Park, one of, if not the finest private collection of natural history specimens in the world. As you are aware, the bubonic plague and, it is suspected, even leprosy, has been spread to man by fleas, so that much attention has been paid the last few years to these insects.

I visited the Tropical School of Medicine attached to the Liverpool University, where Mr. Robert Newstead, the leading economic authority in England, has charge of the entomological work, and where the identification of all the insects and their parasites which have been found or are suspected of spreading tropical diseases, such as malaria, yellow fever, and "sleeping sickness" are collected and preserved. At the present time this school, which has made such wonderful discoveries in the advancement of medical entomology, has three expeditions in the field—two in Egypt and Central Africa, and the third in Brazil. The institution is well supported by the merchants of Liverpool, and at the present time they are subscribing funds to establish a Professorship of Entomology in connexion with the University. The damage to trade in Central Africa caused by "sleeping sickness" can hardly be estimated; the presence of the Blood Sucking Fly (*Glossina nobilis*)—closely related to the much better known Tsetse Fly of more Southern Africa—has altered the whole trade relations of a vast territory, and is spreading every year. This fly by biting man introduces an organism known as Trypanosoma into the blood and causes the death of infected persons. Just after I left London an International Sleeping Sickness Conference was held in London, where scientific men from Germany, Belgium, France and England met. An idea of the ravages wrought by the disease will be gathered on reading the following extract from an African newspaper issued last month :—

It is hardly seven years ago since the terrible and at present incurable malady known as Trypanosomiasis or Sleeping Sickness first made its way into Uganda from the Congo basin. In a few months it spread with terrible rapidity, and within a year of its appearance over 20,000 people died in the single district of

EFFECT OF "POLLARDING" OAK TREES.

J. Johnstone, Officer in Charge of State Plantations.

Recently I inspected the deciduous trees growing in Sturt-street, Ballarat. I found them badly infested with scale. Spraying and painting experiments had been tried, but proved unsatisfactory. Some of the trees were pollarded a few years ago and the limb stumps have produced a dense young growth; on some of this growth I found scale. As the scale is fond of young wood growth it is only a matter of time when this newly-formed head growth will be as bad as the trees were before they were headed back.

Most of the oaks that adorn this street are of a fair age, and possess sturdy trunks and spreading branches. Some of the umbrageous specimens exhibit in their head growth the much-admired gnarled storm-beaten appearance—a charm that adds to the beauty of the statuary decorations. Deprive the stems of such limbs worked out by Artist Nature and the cheerfulness and variety of the street life will be lost and the "stumped" stems will become cripples and artificial dwarfs.

Sun-shade trees are too often neglected until they have attained their utmost limits and passed beyond the science of the judicious pruning which is in harmony with nature's laws. There are people who believe that trees cannot grow properly unless they are controlled by constant butchery. This is against the laws that govern vegetable growth. When operating on shade-production trees to make them suit their allotted growing space, care and judgment should be exercised, based upon cause and effect—two principles which should be founded upon an artistic recognition of what the tree is to be in the distant future.

Healthy oaks can be "pollarded" when young and full of sapwood. In the forests to make well figured grain, polling is done—that is, the tops of the young trees are cut off. This causes the fibres to twist in their efforts to send out a new growth. From these twists we obtain our well-figured and highly ornamental oak timber. "Pollarding" or "stumping" the oaks in Sturt-street, where conditions are different, should not be done. In these trees the formation of heart wood has long since commenced; and is now a fair thickness both in stem and limbs. By the removal of such limbs the sap flow would be disarranged, and the action of the root growth seriously checked, hence the death of the fibrous roots—the servants of the leaves. By exposure of the inner wood on the stump ends a way is made for germs of rot that are ever in the atmosphere to enter and soon fungoid diseases would follow. Though these diseases would be active the effects would be invisible for a long time.

It should always be remembered that all shoots are connected with the roots. Removing the head growth sickens the roots and weakens the vegetative powers of the tree, and the heart-wood becomes brown by decay. Such timber—if taken in time—is valuable and much sought after for cabinet work, but if allowed to stand, as it should be in Sturt-street, it would soon be turned into a breeding place for white ants.

I fail to see what can be gained by removing the head growth as the stem stumps will send out a young growth that will in a few years' time afford better food for the scale than would the older ones if left on. If the old head growth is allowed to remain, an active man could do good work by regulating the growth and removing undesirable twigs and branches, and at the same time spraying with kerosene, &c., when required.

I have seen young oak trees which four years ago were covered with scale and to-day are free from it. If trees are kept healthy, when

they grow up and start to mature the scale will disappear, or almost so. Oaks with large leaves are more subject to the scale than those with smaller leaves. The goldfinches are the greatest enemies the scale has. It is wonderful to see how well they can clear an oak tree.

ERADICATION OF BRACKEN.

Alfred J. Ewart, D.Sc., Ph. D., F.L.S., Government Botanist.

The fronds should be burnt off if possible. If not cut off and used for bedding, or dried and burnt in heaps, they may be ploughed in if the land is at all poor in humus, but are then apt to be raked out again with the rhizomes.

The land should be ploughed as deeply as possible, and the rhizomes near the surface raked out in rows by a horse rake and then into heaps. If chaffed with hay, especially after steaming, and placed in a silo the rhizomes make good nutritious food as they contain much starch. The fodder should not contain more than 10 to 20 per cent. by weight of the rhizomes since they contain large amounts of tannin and other astringents and by themselves are unpalatable and injurious in their action on stock. The moment the land is clear and fairly well broken up, potatoes should be planted and repeated a second year, or the first crop should be followed by drilled maize or some other green crop which can be worked between the rows while young and which when older covers the ground with dense leafy foliage. In this way a small but immediate return can be obtained while the land is being cleared, but in any case drainage will be necessary if the land is at all wet or sodden. Bracken land usually needs liming, half to one ton per acre, or even more when first broken up, and within two or three years needs ordinary farmyard manure. Phosphates will only be needed later on when grain is grown. The above plan has succeeded very well on bracken land near Melbourne, an immediate profit being secured from newly broken bracken land.

THE PROCLAIMED PLANTS OF VICTORIA.

(Continued from page 480.)

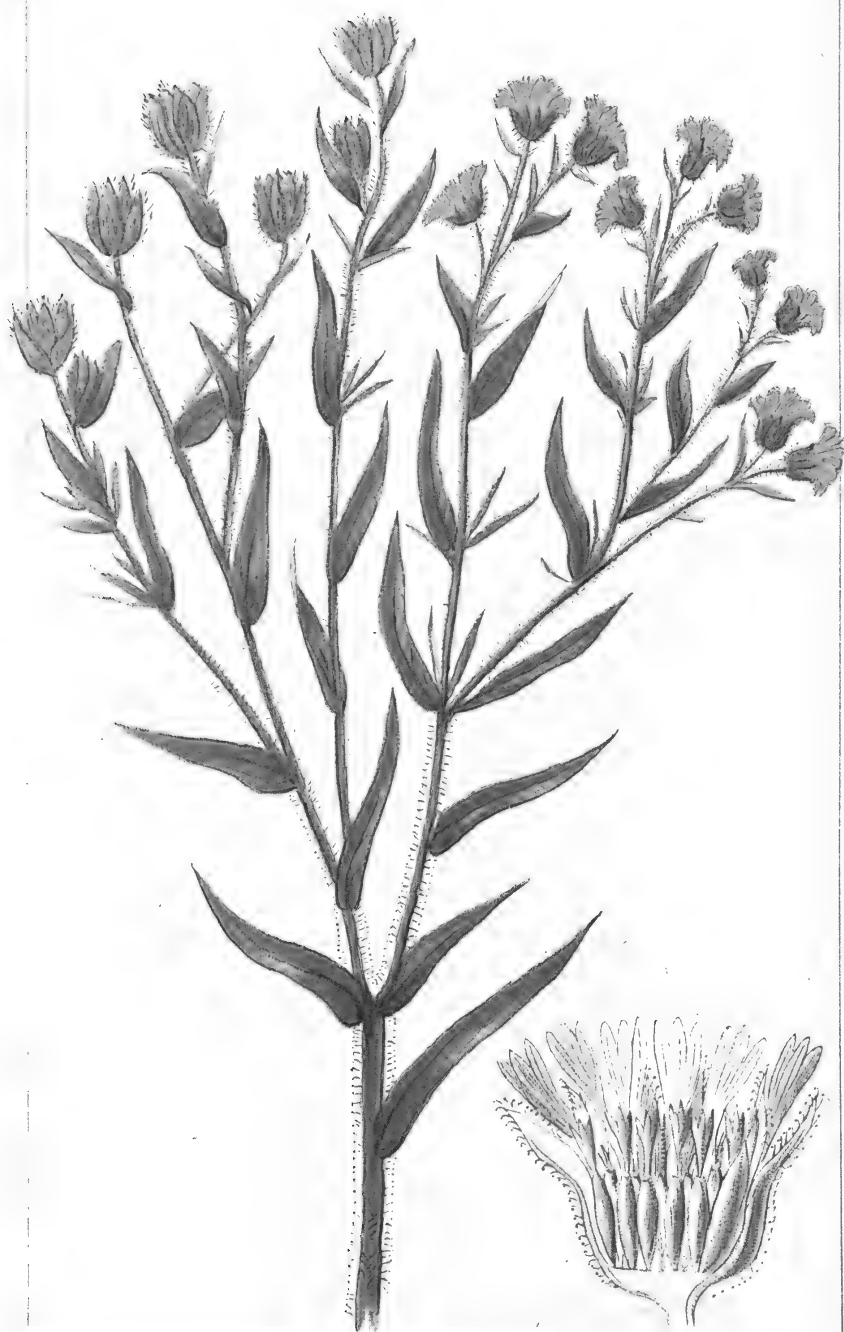
*Alfred J. Ewart, D. Sc., Ph. D., F.L.S., Government Botanist; and
J. R. Tovey, Herbarium Assistant.*

The Pitch Weed.

Madia sativa, Mol.

This erect annual, with opposite or alternate narrow pointed leaves, and small yellow heads of flowers is obnoxious on account of its sticky hairs, and though not of any appreciable economic value is only locally abundant or troublesome. It has been proclaimed for the shire of Violet Town.

The plant is a native of Chili, but probably reached Victoria *via* Europe, where it is sometimes grown for the nutty cooking oil extracted from its seeds. Since the seeds do not appear to be long lived, and the plant is an annual, it is easily kept under by cultivation and hoeing, if care is taken to keep waste places, and the edges and borders of fields clean. The plant may be largely pulled out of pastures by using a closely toothed horse rake or scuffer after rain before it has ripened its seed.



O. Wauer, Del.

A. J. Ewart, Dir.

J. Kemp, Govt. Printer.

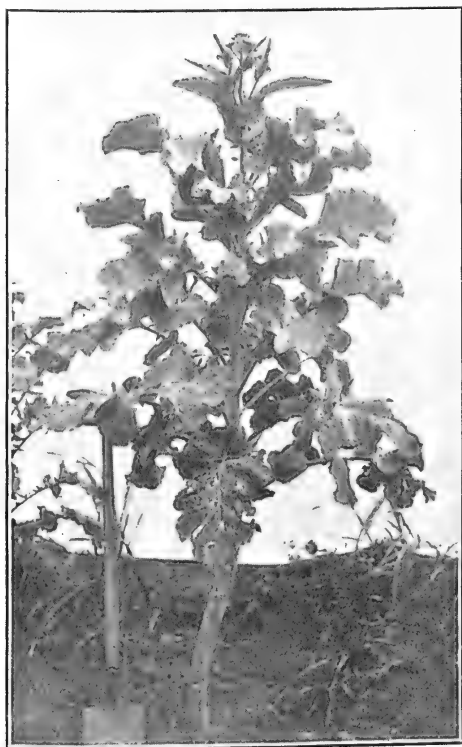
PITCH WEED.
(*Madia sativa*, Mol.)

A NEW FODDER PLANT.

The "Chou Moellier."

J. M. B. Connor, Dairy Supervisor.

A valuable summer and winter fodder plant suitable for stock of all kinds is shown in the accompanying photograph. It belongs to the Kale family of plants, and is called "Chou Moellier." It grows 4 to 5 feet high, yielding a heavy wealth of succulent foliage; the stalks are solid, and fleshy, and have not the woody or fibrous texture of the ordinary cabbage. The leaves can be stripped off, about five times during the season, and the whole plant can be chaffed and fed to the animals with absolutely no waste.



THE "CHOU MOELLIER."

A small crop of this new fodder plant grown by me proves it to be a rapid and vigorous grower, highly nutritious and eagerly sought after by stock. It can be sown with every confidence after the first autumn rains to the end of October, and is both frost and drought resistant, as the crop under review has demonstrated. Without manure or artificial moisture of any kind since planting, it has kept growing vigorously the whole time, and has been stripped of its leaves three times. It is most important to

check evaporation and keep moisture in the soil by maintaining a "dust blanket" or soil mulch on the surface, by means of a continuous stirring of the soil while the plant is growing. The rows require to be moulded up, otherwise the plant becomes top heavy and falls down.

The seed was sown early in March, thinly, in rows 2 feet apart; where the plants showed too thickly they were transplanted. On the 4th June the plot was calculated to have produced foliage equal to the weight of 4 tons to the acre, and at the present time (31st August), when the plants are starting to seed, it would yield the same amount. The leaves should be cut off when required and not pulled; otherwise, the new sprouts will not shoot again from the old source. It is an exceedingly valuable forage plant, yielding a large amount of green feed during winter time, and on that account is especially of service to dairy farmers. I have no hesitation in recommending its culture. One pound of seed sown in prepared seed beds, will furnish enough plants for transplanting to sow about one acre.

THE PROCLAIMED PLANTS OF VICTORIA.

(Continued from page 544.)

Alfred J. Ewart, D. Sc., Ph. D., F.L.S., Government Botanist; and
J. R. Tovey, Herbarium Assistant.

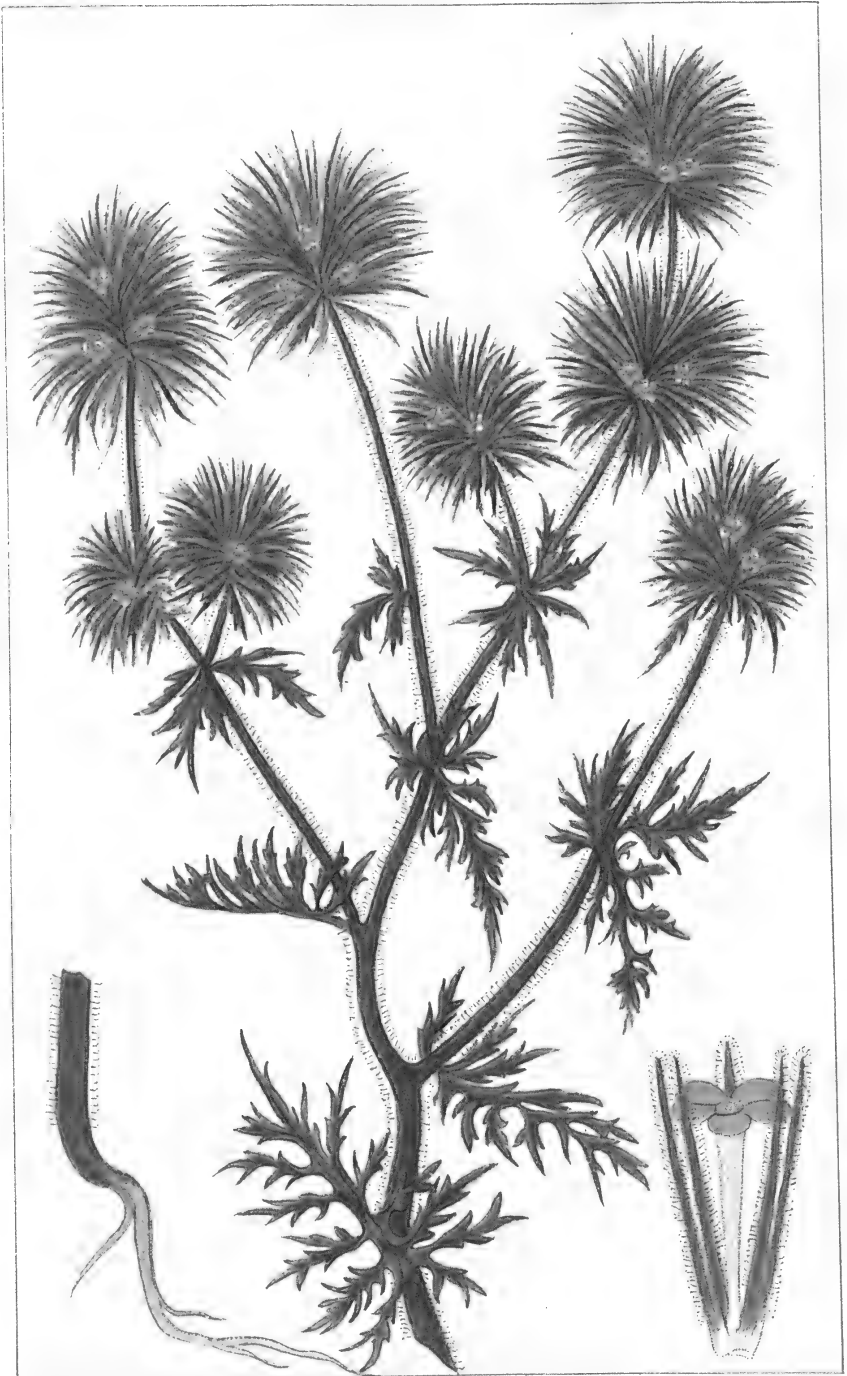
Californian Stinkweed, or Sheepweed.

Gilia squarrosa, Hook and Arn. *Polemoniaceae*.

It is also known as Digger's Weed and is a rather rigid plant, not exceeding one to two feet in height. The stems branch copiously in more or less zig-zag fashion and like the leaves and calyces are covered with glandular viscid hairs, emitting a foetid smell. Leaves one to two inches long, deeply cut into pointed pinnate segments, the upper leaves and bracts simpler and spiny. Flowers in dense heads surrounded by green leaf-like bracts. Calyx of five pointed segments united at the base and exceeding the pale-blue, occasionally white, corolla lobes. Stamens and trifid stigma within the tube of the corolla.

The plant is a native of California, and other parts of North America, hence Californian Stink-weed, and was originally found on moist ground in mountain valleys. In Victoria, however, it withstands drought and spreads rapidly, being a freely seeding annual or biennial. The plant is a troublesome and aggressive but non-poisonous weed. On cultivated land it is easily kept under by clean cultivation, by the growing of root-crops, and by the destruction of seedlings by hoeing and working the soil during dry weather. On pastures and waste places, cutting before seeding will help to keep it down, and if repeated until the seed in the soil is exhausted will eventually suppress it. The seed in the soil appear to be short lived, and if the pasture is periodically rested and a good stand of grass maintained, this aids in preventing seedlings from re-establishing themselves.

Proclaimed under the Thistle Act for the whole State, March, 1907.



O. Wauer, Del.

A. J. Ewart, Virex.

J. Kemp, Gov. Printer.

CALIFORNIAN STINKWEED OR SHEEPWEED.

(*Gilia squarrosa*, Hook and Arn.)



Perishable and Frozen Produce.

Description of Produce.	Exports from the State.		Deliveries from the Government Cool Stores.	
	Quarter ended 30.9.1908.	Quarter ended 30.9.1907.	Quarter ended 30.9.1908.	Quarter ended 30.9.1907.
Butter ... lbs.	1,392,888	3,779,800	461,440	1,750,880
Milk and Cream ... cases	3,409	11,998	70	...
Cheese ... lbs.	113,640	220,440	4,880	180
Ham and Bacon ... "	406,560	671,040	...	...
Poultry ... head	1,660	4,365	3,383	1,704
Eggs... ... dozen	...	30,870	2,503	12,591
Mutton and Lamb carcasses	566	9,454	806	2,229
Beef ... quarters	8	255	955	...
Veal ... carcasses	768	1,559	300	76
Pork... ... "	38	243	...	33
Rabbits and Hares ... pairs	985,398	2,007,432	127,871	527,826
Fruit ... cases	585	6,418	1,506	564
" Pulp ... "	...	...	...	...
Sundries ... lbs.	...	...	7,081	3,734

R. CROWE, Superintendent of Exports.

Fruit, Plants, Bulbs, Grain, &c.

Goods.	Imports.		Exports.		Goods.	Imports.		Exports.	
	Inter-State.	Oversea.	Inter-State.	Oversea.		Inter-State.	Oversea.	Inter-State.	Oversea.
Apples ...	38,649	—	791	110	Oats ...	7,037	32,401	—	—
Artichokes ...	2	—	—	—	Onions ...	2	40	—	—
Asparagus... ..	1	—	—	—	Oranges ...	94,451	—	391	747
Barley ...	5,737	—	—	—	Passion fruit	6,568	—	—	—
Beans ...	97	219	—	—	Peas ...	1,769	—	—	—
Bulbs ...	2	22	10	—	Peas (green)	144	100	—	—
Bran ...	—	937	—	—	Paw-Paws ...	3	—	—	—
Bananas, b/s.	40,552	51	—	—	Parsnips ...	2	—	—	—
Bananas, c/s.	8,808	219	512	6	Pineapples ...	19,913	—	480	474
Cucumbers ...	663	—	60	—	Plants ...	336	577	401	423
Carrots ...	5	—	—	—	Pumpkins...	128	—	2	—
Cocoanuts ...	126	121	—	—	Potatoes ...	41,781	—	10	—
Currants ...	—	2,150	—	—	Pears ...	11	—	2,404	—
Chillies ...	7	10	—	—	Pomelos ...	—	5	—	—
Dates ...	—	300	—	—	Rice ...	1,252	14,585	—	—
Figs ...	—	—	2	—	Rhubarb ...	1	—	—	—
Garlic ...	—	1	—	—	Shaddocks ...	8	—	—	—
Granadillas ...	3	—	—	—	Seeds ...	769	3,407	—	—
Green Ginger ...	13	27	—	—	Strawberries	118	—	—	—
Lemons ...	4,435	—	69	1,533	Sweet Potatoes (Yams)	56	66	—	—
Lines ...	—	—	1	—	Tomatoes ...	658	—	4	—
Loquats ...	152	—	6	—	Turnips ...	6,022	—	53	—
Maize ...	590	5,607	—	—	Vegetables ...	—	103	917	—
Mixed fruit	4	—	—	—	Jams, Sauces.	—	—	—	—
Mangel Wurzel ...	10	—	—	—	&c. ...	—	—	—	688
Mace ...	—	19	—	—	Dried fruits	—	—	7	2,174
Nutmegs ...	69	239	—	—	Fruits in Liquid ...	—	—	—	3,367
Nuts ...	31	1,024	20	—					
Total ...	93,956	10,937	1,471	1,649	Grand Totals	280,985	62,221	6,140	9,522

Total number of packages inspected for the quarter ended 30th September 1908 = 358,868.

J. G. TURNER, Senior Inspector Fruit Imports and Exports.

THE PROCLAIMED PLANTS OF VICTORIA.

(Continued from page 592.)

Alfred J. Ewart, D. Sc., Ph. D., F.L.S., Government Botanist; and
J. R. Tovey, Herbarium Assistant.

The Thorn Apple.

Datura Stramonium, L. (*Solanaceæ*).

A stout erect annual often over 2 feet high, with forked branches, between which or at their ends the flowers arise singly on short stalks. It bears large almost triangular irregularly toothed leaves. The long tubular calyx falls off after flowering, leaving a more or less prominently toothed rim under the capsule, which usually splits into segments during ripening. The corolla is large white or purple and with five short usually yellowish points, capsule globular, prickly, with numerous dark wrinkled seeds.

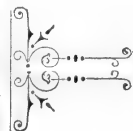
The Thorn Apple, a native of the East Indies originally, is now spread over the whole globe. It appears to be spreading over Victoria, and contains a highly poisonous narcotic alkaloid, Daturin. Fortunately, the strong bitter taste of its leaves usually keeps stock from eating it, but this very fact, and its abundant production of seed, aids the plant in spreading rapidly. As an annual it can be kept under on pasture land and waste places, by hoeing or pulling up before it has time to seed. If the plants are at all old they should be piled and burnt on the spot to destroy the seeds. On arable land, it is kept under by the ordinary process of cultivation, harrowing to destroy seedlings as the seeds germinate. Care should be taken to prevent any plants becoming old enough to seed, and also to prevent fresh introduction with impure seed. The dark wrinkled seeds are unlike those of any common cultivated plant.

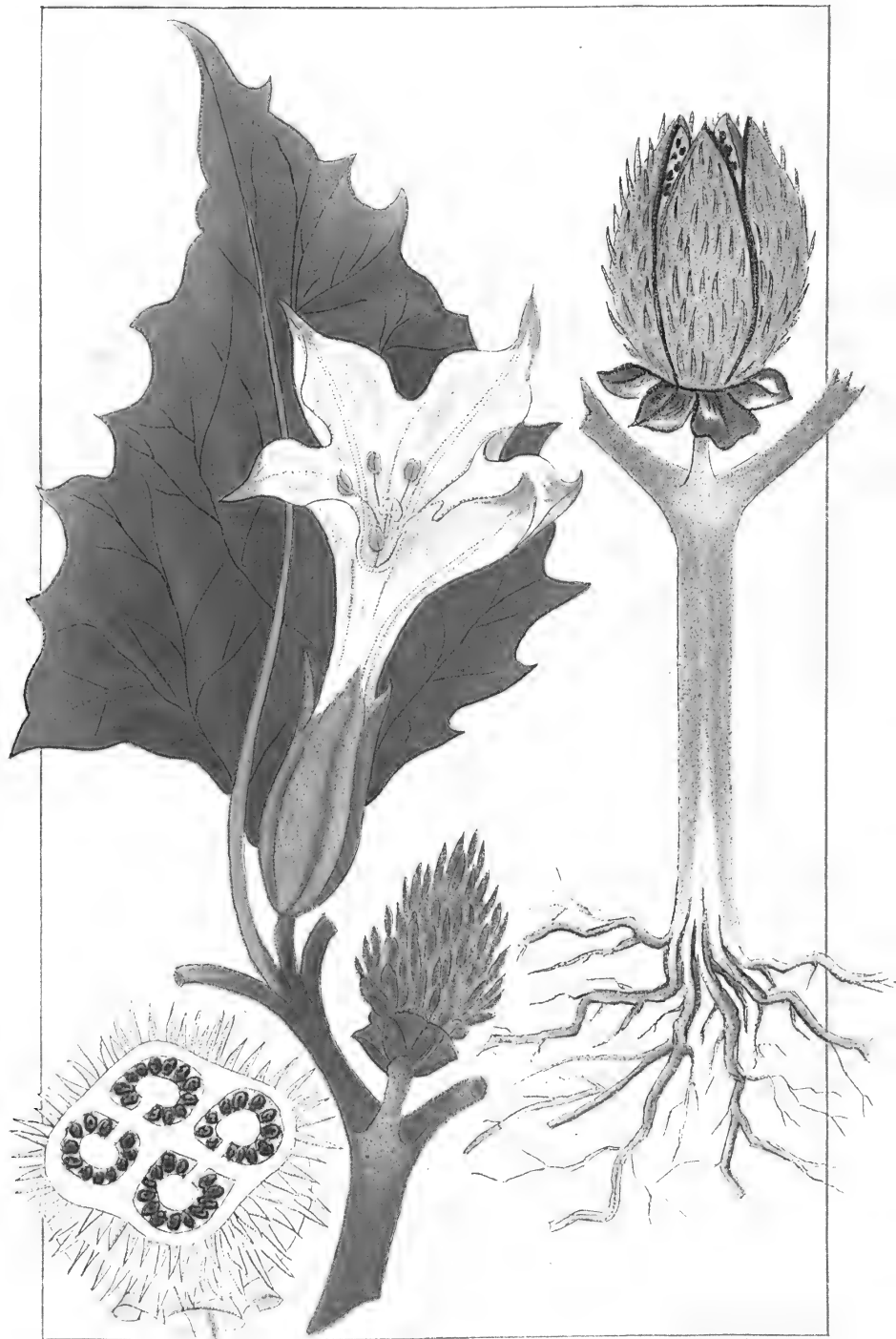
Proclaimed under the Thistle Act for the whole State, June, 1907.

Two tobaccos, members of the same Order as the preceding, are also common, but are not proclaimed.

Nicotiana glauca, Graham.—The Tree Tobacco is a shrubby garden escape, introduced from South America, which seems likely to become a nuisance in some of the northern districts, though of use for producing rapidly-growing shelter hedges. In excess the plant is undoubtedly poisonous, though moderate quantities can be eaten without serious consequences. Fortunately, it is not very palatable, although, as in the case of many poisonous or injurious plants, stock may acquire a morbid taste for it. The plants should be dug up, piled, and burnt before flowering. Deep ploughing buries any seeds present in the soil, and they soon die.

Nicotiana suaveolens, Lehm, is a similar but small native tobacco, which, like the former, is comparatively resistant to drought, also feebly poisonous and apt to become a troublesome weed if allowed to spread.





O. Wauer, Del.

A. J. Ewart, Drex.

J. Kemp, Govt. Printer.

THORN APPLE.
(*Datura stramonium*) L.

and it is under these conditions that sweet ensilage—the best ensilage—is made. With the higher and longer sustained rise in temperature more or less acidity is developed in the ensilage; and as this change, which is patent to our observation, is also a chemical change that alters the composition in the direction of reducing the feeding quality of the material, the production of sweet ensilage is the more economical. The souring of silage may arise from several causes, such as from ensiling the fodder in a too immature stage; from too quick filling; from the material not being properly tramped or packed in; or from any other cause that may increase the temperature in the silo—a high temperature being the antecedent of development of acidity. In general practice it has been found that about 6 feet is a sufficient depth of material to fill into the silo each day if a minimum temperature is to be maintained; a greater depth tending towards increased heating.

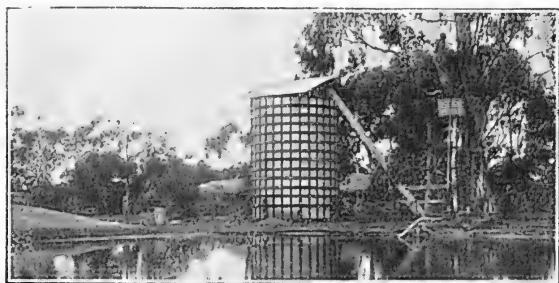
Where any decomposition occurs near the wall surface of a silo it is usually the result of want of care in filling; this being the place where the work of tramping or pressing down is usually most neglected. If the material is not tightly packed at the wall, air must gain access to the adjacent material, and some loss will result. If the walls of the silo were constructed of particularly porous material, such as soft brick, and built above ground, a little loss might occur over the whole wall surface; but the porosity in such cases could usually be checked by the application to the inner wall surface when the pit is empty of a cement wash or a coat of hot tar, to which pitch has been added at the rate of 1 lb. to the gallon. In the filling of a silo a very heavy pressure obtains on the wall surface; but with the cooling and settling down of the mass this pressure diminishes, till the material becomes a solid body more or less independent of any support. When this has taken place any carelessness in filling that has allowed for the admission of air between the silage and the wall will be followed by the decomposition of some material at that place.

In opening the silo, and using the ensilage, the same principles must be observed as in filling and closing it. No more fodder should be taken out each day than can be used. The required quantity should be taken off evenly and regularly from the top of the silo; and, if feeding the ensilage should be stopped for even two days, what remains in the silo should be as carefully covered again as before. The using of the fodder from the side surface of a bush silo is also undesirable; and should not be attempted unless all that is in the pit is certain to be used without a break; for it is almost impossible to cover up a side surface if once exposed; and moulding and decomposition of the exposed silage will result.

To clean ground fouled with weeds without loss of time there is no more profitable way than to make a sowing in the autumn of mixed fodder such as peas and oats, or rye and tares, for green stuff; and then to follow it up, when harvested, by a maize crop with summer cultivation. The green stuff should be harvested for ensilage before the weeds have seeded out; and, under the fermentation in the silo, the germinating power of all weeds is destroyed. If the maize is then sown in fairly wide drills—as it should be, in order to obtain a plant rich in feeding value—and the intervening ground kept well stirred throughout the summer, there should be very few weeds to interfere with a succeeding crop.

Where there is a choosing between maize and any of the cereals as a crop for ensiling the balance must be always in favour of the maize on account of the greater yield. In considering maize ensiling versus hay growing for dairy stock there is absolutely no comparison in returns obtainable, everything being in favour of the maize.

The advantages of having a quantity of green fodder chaffed and stored as silage for winter use are many and obvious. To have to go to the field for a load of fodder and get it into the mangers on a wet day is a task under any circumstances; and when the ground is soft or when the horses are required for other work it is very satisfactory to know that the cows can be well supplied with little labour from a store of succulent fodder close at hand. The possession of an ample supply of ensilage unquestionably makes towards improved dairy returns, while also allowing of the general work of the farm being more systematically and expeditiously carried out. Succulent fodder practically insures a good milk yield; and only in very exceptional cases can this be obtained throughout the autumn and winter months without the use of the silo.



A SILO IN THE MALLEE.

THE PROCLAIMED PLANTS OF VICTORIA.

(Continued from page 672.)

Alfred J. Ewart, D. Sc., Ph. D., F.L.S., Government Botanist; and
J. R. Tovey, Herbarium Assistant.

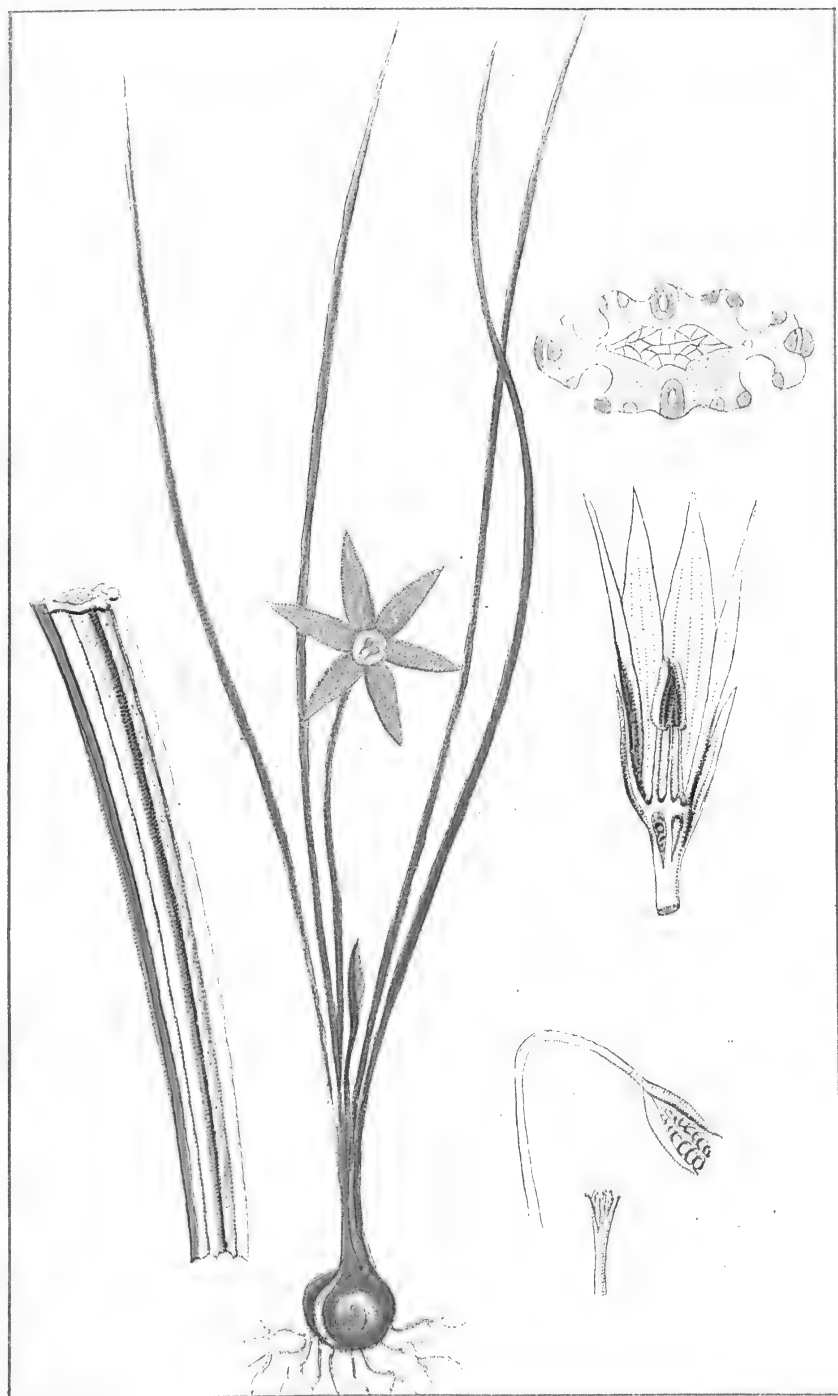
The Guildford or Onion Grass.

Romulea (Trichonema) cruciata, Ker.-Gawl. (*Iridæa*).

This South African plant was called *R. Bulbocodium* (a native of the Mediterranean regions and Scilly Islands) by Baron Mueller, and has been known as *R. rosea* (a native of South Africa), in New South Wales and Tasmania, but is easily distinguished from these species by its short style not projecting beyond the stamens, a character constant in several hundred flowers examined. *R. longifolia*, of Baker, is a synonym, and the Australian *R. cruciata* seems to have diverged sufficiently from the type form of *R. rosea* to be recognised as a distinct species. Each shoot usually bears one or two flowers, but sometimes a single corm develops a cluster of shoots, and the plant then appears to be many flowered. The plant was abundant in the neighbourhood of the Botanical Gardens 40 or 50 years ago, but it has now taken possession of entire paddocks, roadsides and waste places, and like many bulbous plants it is difficult to eradicate.

Its pinkish purple flowers look very pretty among its green grass-like leaves in spring, as they open when the sun shines on them and close at night or in cold weather. The leaves appear in April or May, the

PLATE 31.



O. Wauer, Del.

A. J. Ewart, Diner

J. Kemp, Govt Printer

ONION GRASS.

(*Romulea cruciata*) Ker-Gawl.



flowering begins in August, and usually lasts at least two months, the capsules continuing to ripen until November or December, before which time the leaves have died down. The seeds germinate mostly early in the following season when the soil is moist, some may retain their vitality apparently for a few years in the soil.

The ripe corms when crushed yield relatively large amounts of fine-quality starch. They are eaten by pigs and cockatoos, which in some parts have cleared whole districts more or less thoroughly.

Eradication.—The plant is a sun-loving one, preferring hard, dry, more or less bare, unshaded ground, vegetating in winter time and resting during summer. Poisons are utterly useless, as with nearly all weeds.

Cultivation soon suppresses it, winter wheat, followed by farmyard manure and potatoes, being especially good for the first two years; but a green fodder crop is equally good if it is up early in the year, and stands over winter. Fencing off and resting a portion of the pasture each winter will aid the grasses greatly in suppressing the weed. The treading of stock on wet ground is very bad for any pasture, if the soil is given no chance to loosen out and become porous again. The spread and damage done by this weed is mainly due to improper pasturage methods. All continually grazed and cropped pastures steadily deteriorate, especially when the practice is added of collecting and carrying away the droppings to cultivated land, instead of spreading the droppings and loosening the soil by the aid of scarifiers. Pasture land which is divided into paddocks by good wind-proof hedges, rested from time to time, enriched with humus instead of being robbed of it, and kept open and pervious by the use of scarifiers, will not be troubled by onion grass to any great extent, will have a less tendency to become tussocky, and will carry twice the amount of stock that one large paddock with continuous grazing and cropping would do. Further, the difference in carrying power will be even more pronounced in times of drought than in winter time.

When the leaves are quite young stock will browse on the onion grass, but they are not fond of it, and as soon as the leaves become adult they are so tough and wiry that the stock often pull up the sods, or draw out their own teeth. Statements are current that lambs eating the leaves become paralysed, and that cockatoos after eating the underground corms become stupified as with a narcotic, but the statements lack scientific confirmation and appear to be based on scanty and not altogether trustworthy evidence. Experimental tests are needed.

Stock Roads and Waste Places.—The latter should wherever possible be covered with trees, preferably quickly growing and closely planted timber trees. The same applies to the former, except that in many cases closely planted acacias would be preferable. They suppress the weed completely, give shade and protection without overshadowing the road too much, yield useful products, bark and wood, and add greatly to the beauty of the roads.

Lawns and Cricket Grounds.—Frequent and close cutting during the growing period, and as long as any flowers appear (May-October) will exhaust the underground corms and prevent the formation of fresh seed. If the ground is trodden and baked hard by trampling in all weathers it must be loosened, a top-dressing of well-rotted stable manure applied, and not rolled too heavily. *Romulea* does not like light porous ground fairly rich in humus. It prefers ground which is dry in summer time but moist in winter.

Parasites.—A fairy ring fungus which forms brown irregular circles in the grass, also grows on and destroys the bulbs, but they soon reappear in the grass behind the rings, and the fungus does more harm to the pasture than it does to *Romulea*. Loosening the soil, and the addition of lime aid in keeping down the fungus.

The plant is proclaimed for the whole State.

TOOWOOMBA CANARY GRASS.

THE SO-CALLED "PHALARIS COMMUTATA."

Alfred J. Ewart, D.Sc., Ph.D., F.L.S., Government Botanist and Professor of Botany at the Melbourne University.

This fodder grass has recently been largely advertised as the king of all winter grasses. It is stated to have been first introduced into Australia by Mr. R. Harding, curator of the Botanic Gardens, Toowoomba, Queensland, to whom credit is generally given for its introduction and distribution. Mr. Charles Ross, manager of the State Farm, Westbrook, Queensland, however, informs me that it was introduced into Toowoomba over twenty years ago, when the late Mr. Way was curator of the Botanic Gardens. The seed was received with about sixty other grasses from the Agricultural Department of New York, U.S.A. All the varieties were lost but this one, which existed in out of the way places, such as hedgerows and rubbish-heaps. Mr. Harding drew Mr. Ross' attention to this grass four or five years ago and gave him a root. Recognising its value he (Mr. Ross) at once began to propagate and distribute it. Hence, as is often the case, the credit of introducing and spreading this grass is not solely due to one man but is to be apportioned amongst several.

"*Phalaris commutata*," is a native of the foothills of the Alps, and other parts of Italy. Mr. Webb, in the Sydney *Daily Telegraph*, 17th June, 1908, stated that this Italian grass was imported from America for the Toowoomba Experimental Farm in 1884, with a lot of other grasses. On account of great drought none did any good and they were thrown away on a rubbish-heap. Some years afterwards a beautiful grass was observed doing well where the roots had been thrown. This was "*Phalaris commutata*."

In the *Agricultural Gazette of New South Wales*, 1908, page 849, a number of reports from the different agricultural stations are given in regard to its utility for grazing and fodder purposes. The reports are very conflicting, but on the whole it is agreed that it grows well in winter, and up to about December when it seeds. The stems are then rather hard, so that if it is to be used for hay it must be cut early while fresh and green. The flat, succulent leaf is readily eaten by stock, including sheep. Since the plant is not only a perennial but also seeds freely, it should maintain itself well, even under continued grazing. In any case, however, it has still to be shown that it is superior to all or any of the fodder grasses already known and in common use. For permanent pastures it is, for instance, not certain whether it is any better than *Phalaris minor*, a well and long known species of the same genus.

For some time, the National Herbarium has been in doubt in regard to the correctness of the name given to this plant. The Kew Index makes *Phalaris commutata*, Roem. and Schult, a synonym to *Phalaris coeru-*

lescens, and at one time it was thought possible that the plant might prove to be a cross between *Phalaris coerulescens* and *Phalaris arundinacea*. Specimens were sent to Kew Gardens, and to Professor Hackel. The director of the Royal Botanic Gardens, Kew, writes that the plant received for identification is *Phalaris bulbosa*, L. (1755) (synonym, *Phalaris nodosa*, L. (1774). *Phalaris commutata*, Roem. and Schult. is, according to Bertoloni, a composite species described from the base of a specimen of *Phalaris bulbosa*, and an inflorescence of *Phalaris minor*. *Phalaris bulbosa* is a well-known native of the Mediterranean region, but I can find nowhere any account of its properties or usefulness as a fodder grass, and in general the genus *Phalaris* appears to be of more value for its seed (canary seed) than for fodder or grazing purposes. In any case it is doubtful whether the grass would be a suitable one for rotation farming, so that trials in this direction should be conducted with caution. Professor Hackel writes to say that he considers the plant to be a new, undescribed species intermediate between *Phalaris bulbosa* L. and *Phalaris arundinacea*, L. From the latter it is distinguished by the want of subterranean scaly-leaved runners, by the wing on the keel of the sterile glumes, which is, at least 0.4 millimetres broad, (in *Phalaris arundinacea* it is wanting or minute) and by the absence of the three sterile glumes, which are present in *Phalaris arundinacea*. The same character distinguishes it from *Phalaris bulbosa*, which has also much broader wings on the keel of the sterile glume and which has three to four bulbous lowest internodes of the culm. The name of "*Phalaris commutata*" was given by Roem. and Schult. to a plant gathered near Genoa (Italy), and described as having a bulbous culm and the wing of the keel of the sterile glumes *denticulate* (like that of *Phalaris coerulescens* and *minor*). It is possible that *Phalaris commutata* is a synonym of *Phalaris coerulescens*, but Bertoloni says that the specimen was combined of the vegetative parts of *Phalaris bulbosa* and the inflorescence of *Phalaris minor*. Modern Italian botanists have suppressed this doubtful name.

Professor Hackel proposes to give the name of *Phalaris stenoptera*, to this grass, on account of the very narrow wing on the keel of the sterile glumes. There is, therefore, a difference of opinion between two weighty authorities as to whether this grass can be referred to an existing species (*Phalaris bulbosa*) or is an entirely new one, but both agree in suppressing the name of "*Phalaris commutata*." If Professor Hackel is correct and we are dealing with a new species, the question arises as to its origin. Its free powers of seed production point against a hybrid origin, and we have no guarantee that the seed originally imported was pure, or in fact, that the plant with which we are dealing was actually derived from the imported seed at all. The gap of four or five years between the apparent loss of the seed and the reappearance of the plant on a rubbish-heap is a big one, and gives room for many possibilities.

The conveyance of a plant of mixed affinities from one country to another by making its seed develop under varied conditions of environment is especially likely to render it liable to sudden saltatory variations, such as de Vries found capable of producing new species in *Oenothera* (the evening primrose). Whether we are dealing here also, with a similar case of the sudden evolution of a new species is difficult to say and can only be determined by the cultural experiments, which Professor Hackel now has in progress. If the characters on which he relies remain constant

and run true to seed, it will be difficult to avoid the conclusion that we are dealing with the sudden evolution of a new species induced in a plastic stock by the action of a pronounced change of environment.

No species of *Phalaris* are native to Australia, but we have no information as to the origin and purity of the seed originally received from the United States. In all probability it came from a number of individuals which were not all precisely alike, and possibly were in some cases strongly dissimilar. The plant which succeeded in surviving in the struggle for existence on the rubbish heap would naturally be the strongest and best suited to extreme conditions. For the present judgment must be suspended, but the name of "*Phalaris commutata*" must be at once suppressed, and can be replaced for popular purposes by Toowoomba Grass or Toowoomba Canary Grass, or Queensland Canary Grass, while we still need more precise information as to whether this grass is really superior to those already known and widely used for fodder and winter grazing. Old lamps are sometimes more valuable than new ones, even outside of fairy tales.

Mr. Bailey, Director of the Botanic Gardens, Brisbane, writes to say that so far he has not received authentic Queensland-grown specimens of "*Phalaris commutata*." Of two specimens received one proved to be *P. arundinacea*, the other *P. nodosa* (*P. bulbosa*). From Mr. Alexander, of Brighton, and from other correspondents, we have received plants of undoubted *Phalaris canariensis* which appeared among the crop of "*Phalaris commutata*." This is all evidence tending to show that Toowoomba Canary Grass is a mixed hybrid, which tends to revert to its parent forms. We shall be indebted to cultivators of this grass if they would note and forward for examination any abnormal plants with different heads to the rest which may appear among the crop. It may be possible in this way to definitely and decisively determine the real nature or origin of this grass, and whether it is (1) a variety of an existing species (*Phalaris bulbosa* L.), (2) a double hybrid (*P. canariensis arundinacea*), or (3) a new undescribed species (*P. stenoptera* Hackel).

THE ORCHARD.

James Lang, Harcourt.

During the month the weather has been unusually dry. The strong drying winds have caused the evaporation of a lot of moisture from the soil, and as from present appearances the dry weather is likely to continue, it is therefore very needful that the ground should be kept stirred and free from weeds in order to conserve all moisture possible. The fruit crop is not going to be as heavy as was at one time anticipated. Apples and pears have thinned out very much more than they usually do at this time; still there will be a good crop of these fruits. With some varieties the thinning out will be an advantage, as the fruit will mature to a much better size than if there had been an over crop, more especially should the season prove dry. Cherries are now being gathered for market. The crop will be light, many of the varieties not setting so well as usual; in some districts frosts cut them a good deal. Apricots and plums will also be light. This is very disappointing as the trees bloomed well and gave promise of a good crop, and in the case of plums a heavy crop of fruit.

UMBILICAL CORD. The shape and attachment of the placenta varies in different species of mammals; in some the finger-shaped processes or villi are simple and when the young is born are detached from the uterine wall without producing any tearing. In such cases the placenta comes away without any portion of the uterus being attached to it—such placentas are termed *non-deciduous*. In others the villi are so locked in the uterine tissue that when the young is born the villi drag with them pieces of the inner wall of the uterus and leave what may be termed an open sore at the site of the placental attachment. Such cases are called *deciduate*. We may classify placentation roughly as follows:—

Deciduate	{ Meta-discoidal—the villi are at first scattered, but are collected into a disc—man and monkey.
	{ Discoidal—the villi are restricted to a cake-like disc—rodents.
	{ Zonary—the villi are restricted to a belt-like band—carnivores, elephant.
Nondeciduous	{ Cotyledonary—villi in patches—ruminants.
	{ Diffuse—villi scattered—pig, horse.

As development proceeds the cells of the embryo increase continually by subdivision and the organs approach nearer and nearer to the condition that they present at birth. One extraordinary fact about embryonic development is that a number of stages are traversed which are singularly reminiscent of stages in the evolutionary ascent of the race. Thus all mammalian and bird embryos at one period of growth show clefts in the throat like the gills of a fish, and the human embryo at one time possesses a tail.

From the moment of entry of the fertilized ovum the uterus begins to change. Instead of the metestrus a long series of important alterations takes place too complex for full description here. The uterus grows parallel with the growth of the embryo and the membranous bag of the latter, its muscular walls increase enormously in thickness and in the size and power of the constituent muscular cells, and, where the placenta is to be formed, an alteration in the inner wall is effected. These important changes in the uterus are the outcome of hormone stimulation. The developing ovum unquestionably furnishes one set of hormones, but these would apparently be useless unless backed up by hormones arising from the ovary and probably from one particular part of the ovary called the corpus luteum (Fig. 63). The corpus luteum is produced from a burst follicle and was originally thought to be only a lump of scar tissue but its secretory importance has been proved beyond doubt for if it be destroyed or if it fail to develop pregnancy comes to a premature end. What exactly determines the onset of parturition or labour has not been discovered. The muscular walls of the uterus contract powerfully in a series of "pains." Thanks to the membranes containing the watery fluid, the narrow neck of the uterus can be dilated without injury being done to the head or fore limbs of the foetus. The pains continue until the membranes burst and the young, after undergoing a characteristic rotation, is driven through the vagina; after a variable interval the membranes and placenta are ejected by further uterine contraction. Once the placenta has been detached from the uterine wall the young animal can no longer get its oxygen from the maternal blood; slight asphyxia therefore ensues and through the stimulation of the respiratory centres by the asphyxial blood the first breath is taken. Coincidentally with this a change takes place in the heart so that the right ventricle which in the foetus sent its blood into the aorta now drives blood into the lungs through the pulmonary artery and the condition of the circulation present in the adult is established.

After the expulsion of the placenta and membranes the uterus rapidly contracts upon itself and undergoes a sort of degeneration, becoming smaller and less muscular, and finally approaches the state characteristic of the non-pregnant female. Its contraction is greatly aided by a nervous reflex started by the young sucking at the teat.

TIME INTERVAL BETWEEN ŒSTRUS AND
ŒSTRUS IN NON-PREGNANT STATE.

Mare	... 3-4 weeks	...
Cow	... 3-4 weeks	...
Sheep	... 17-28 days	...
Sow	... 9-12 days	...

Bitch ... 12-14 weeks (anæstrum) ...

TIME INTERVAL BETWEEN PARTURITION
AND RETURN OF ŒSTRUS.

...	5-9 days.
...	21-28 days.
...	7 months.
...	4-5 weeks, usually
...	8-9 weeks, maximum.
...	2 months.

AVERAGE DURATION OF GESTATION.

Ass	... 365 days.
Horse	... 340 "
Horse (better breeds)	350 "
Cow	... 283 "
Man	... 280 "
Goat	... 154 "
Sheep	... 152 "
" (merino)	150 "
" (southdown)	144 "
Pig	... 120 "
Dog	... 63 "
Cat	... 56 "

AGE OF PUBERTY.

Rabbit, rat,	in 1st year.
Cat, dog, sheep, pig,	in 2nd year.
Horse, cattle,	in 3rd year.
Man,	in 14th year.
Elephant,	between 20th and 30th year.

PERIOD OF SUCKLING.

Foal	... 12-20 weeks.
Lamb	... 8-16 "
Calf	... 6-12 "
Pig	... 4-8 "

INCUBATION PERIOD OF EGGS.

Goose	... 23-33 days.
Duck	... 28-32 "
Turkey	... 26-29 "
Hen	... 21 "
Pigeon	... 17-19 "

(To be continued.)

THE PROCLAIMED PLANTS OF VICTORIA.

(Continued from page 736, Vol. VI.)

Alfred J. Ewart, D.Sc., Ph.D., F.L.S., Government Botanist; and
J. R. Tovey, Herbarium Assistant.

The European Dodder.

Cuscuta europæa, L. (*Convolvulaceæ*).

This annual parasite is easily recognised by its slender, twining, yellowish-green, practically leafless stems attached by minute suckers to the host plant, and bearing clusters of whitish or pinkish flowers. It is as great a pest to agriculture as the Mistletoe is to forestry. Two native species (*C. tasmanica*, Engel, and *C. australis*, R. Br.) are known and have played some part in keeping down native and introduced weeds (St. John's Wort). The most injurious Didders appear to be the introduced ones (*Cuscuta epithymum*, Murr., *C. europæa*, L., *C. trifolii*, Bab., etc.) which are continually imported and spread by seed. These parasites will destroy any leguminous crop if unchecked. Where a whole field is infested the entire crop should be ploughed under, and if this is done before much seed has been formed, after a year's fallowing (bare or green), followed by wheat, oats, maize or a similar crop, it will be safe to use the land for clover, lucerne or leguminous crops. If allowed to seed freely the seed in the soil may not be exhausted for five or six years.



L. White, Del.

A. J. Ewart, Direc.

J. Kemp, Govt Printer.

DODDER.
(Cuscuta Epithymum.) L.

gered on being moved, refused feed, and went right off their milk. The dairyman however did not view the matter seriously as he ascribed the symptoms to over-feeding. It is a common practice for dairymen to give their cattle extra feed on Friday morning to insure a plentiful supply of milk for Saturday's delivery. In the early hours of Saturday morning, 11th December, two died, and professional aid was then obtained. A *post-mortem* examination revealed signs of irritant poisoning, especially in the abomasum or true stomach, which was acutely inflamed. Four other cows exhibited symptoms of sub-acute colic—moaning and grunting at intervals—and were drenched with iron, chalk, and emollients. Medicinal treatment however, proved of little avail as two more died between eight and nine o'clock on Saturday morning, and a like number succumbed through the night.

On Sunday afternoon (13th December) the second autopsy was made, and the following morning another beast, whose udder had been inflated during the previous afternoon, and which had subsequently regained control of its hind quarters, died and was subjected to a *post-mortem* examination. Another death took place on Monday, and the ninth beast being "in extremis" was slaughtered and examined on the following morning.

CHEMICAL EXAMINATION.—Samples of the gastric and intestinal contents of two cows were examined chemically and the presence of arsenic detected. Qualitative analyses of the fodder (bran, pollard, hay) gave negative results, but in the case of the water samples there were "slight indications of the presence of internal poison identical with arsenic." The results obtained by chemical analysis were supported by the appearance of the *post-mortem* lesions and to some extent by the clinical symptoms.

SYMPTOMS.—In his article on "Arsenical Poisoning," Bevan points out that "where the drug has been swallowed the symptoms seem to depend upon the quantity and the form in which it was taken. Thus a very strong solution of a readily absorbed form of arsenic produces most acute symptoms, but solid and compact pieces of arsenic, not easily dissolved, or preparations of the drug not readily absorbed, give rise to less acute symptoms and a slower form of poisoning." Possibly, as he suggests, such solid lumps or particles may remain unchanged in the rumen, causing practically no systemic disturbance till washed on into the more sensitive abomasum and intestines by incoming liquids. In the true stomach and intestinal tube, absorption is rapid and the delicate mucous membranes suffer severely from the caustic properties of the drug.

At Camberwell, only sub-acute cases were encountered. Six died between the 24th and 48th hours and the other three after a longer interval. The chief symptoms exhibited were as follows:—

1. Dullness, weakness, loss of appetite, reduced milk flow, and in some cases groaning and grunting as if in pain.
2. Diarrhoea—the discharge being slightly sanious. In one instance the rumen was impacted and doughy but no violent colic symptoms or tenderness over the belly was observed.
3. Temperature subnormal and ears cold: The thermometer readings ranged from 99.2 deg. F. to 101.9 deg. F.
4. Pulse 90—120; small and weak; almost imperceptible in some cases.
5. Respirations normal; muzzle dry; conjunctivæ slightly injected.
6. Paralysis of hind quarters; staggering gait, and difficulty in rising.

AUTOPSIES.—Four *post-mortem* examinations were held—three on beasts that had died twelve to twenty-four hours previously and one on a

slaughtered beast immediately after death. No marked stiffening of the hides was noticed, but putrefactive changes were considerably less advanced than usual in spite of the fact that hot weather prevailed during the outbreak.

The only really constant lesion discovered was acute inflammation of the abomasum and duodenum. In the slaughtered beast the mucosæ were found to be excoriated in patches, varying in size from a pin point to a large pea. These were distributed all over the abomasum, and the intervening areas of inflammation were, in parts, covered with blood clots.

In three out of the four autopsies the leaves of the first, second, and third stomachs peeled off readily and revealed hyperæmic mucous and sub-mucous layers beneath, and in one instance, a straw coloured exudate about 1 inch thick and 3 inches in diameter was discovered in the peritoneal folds between the rumen and the abomasum.

With regard to the other organs, no constant pathological changes were observed. Petechial spots on the endocardium and on the mucous lining of the gall bladder were noticed in one instance, and an excessive amount of fluid escaped from the abdomen at the second autopsy, but the outbreak was too sudden to permit of the development of those morbid phenomena—fatty degeneration, emaciation, mummification, ulceration—that characterise more chronic cases of arsenical poisoning.

THE PROCLAIMED PLANTS OF VICTORIA.

(Continued from page 32.)

Alfred J. Ewart, D.Sc., Ph.D., F.L.S., Government Botanist; and
J. R. Tovey, Herbarium Assistant.

Bindweed.

Convolvulus arvensis, L. (*Convolvulaceæ*.)

A perennial with annual twining stems, arrow-shaped leaves, and rather pretty, pinkish flowers. The plant is one of the later introductions, and is very troublesome in cultivated ground. Its twining stems choke the plants to which it attaches itself, and its creeping underground stems render it difficult to eradicate, since quite small pieces will start fresh growths, and the stems are often a foot below the surface. The weed is especially troublesome in light friable soil, and in corn crops. Badly infected land should be deeply ploughed, and the underground stems harrowed or raked out. Where patches are present they should be forked out. The free use of the hoe in spring, and the growth of a leafy fodder or a root crop well encouraged by manure will help to keep down the plant and prevent its flowering. The seeds have a very prolonged vitality in the soil, and hence the prevention of flowering and seeding is very important. The plant is less mechanically dangerous on pasture, but the leaves are bitter, the underground stems purgative, and the seeds (four in each rounded capsule) are poisonous to stock if eaten in any quantity. Rotation farming coupled with occasional bare fallowing aids in keeping down a weed of this kind. Great care should be taken to avoid introducing it with impure seed, as has commonly occurred during the past. Its dark, somewhat triangular and roughened seeds are easily recognised. When ground in flour they spoil its colour, and render it injurious if present in any quantity.



J. White, Del.

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BINDWEED.
(*Convolvulus arvensis*) L.

ST. JOHN'S WORT.

NOTES ON RESULTS OF CHEMICAL WEED ERADICATORS EXPERIMENTED WITH.

H. W. Davey, Inspector, Vegetation Diseases Acts.

In order to form an idea of the effect of chemical weed exterminators after several years, I revisited Bright on the 29th January to inspect the plots treated with chemicals for the suppression of St. John's Wort. I found the plots treated with Murton's Weed Killer during February, 1905, covered again with the weed, partly from the recovery of old established plants and partly from seedlings. These plots are in the Racecourse reserve running parallel with the Harrietteville Road; the plots facing the grand stand are all covered with the weed but it is rather stunted as compared with the untreated weed outside the plots.

The three acres on the Harrietteville Road which were fenced in for treatment are all once more infested. Plot 12 in this area was treated with $\frac{1}{2}$ ton of salt on 29th November, 1904, and the weed was destroyed but the land has been reinfested from seeds washed down from land higher up the hill; the plot is on very steep land and every rain must wash a lot of seed down. Plot 11 in same paddock, treated with Invicta in October, 1904, is on the level country below the race and the kangaroo grass has held its own against the weed fairly well. In some spots the grass has beaten the weed badly, but I put this down to the moisture being especially favorable to the grass and adverse to the deep roots of the weed. Seed from the weed has not much chance against the grass especially as the latter is protected from being eaten out by stock.

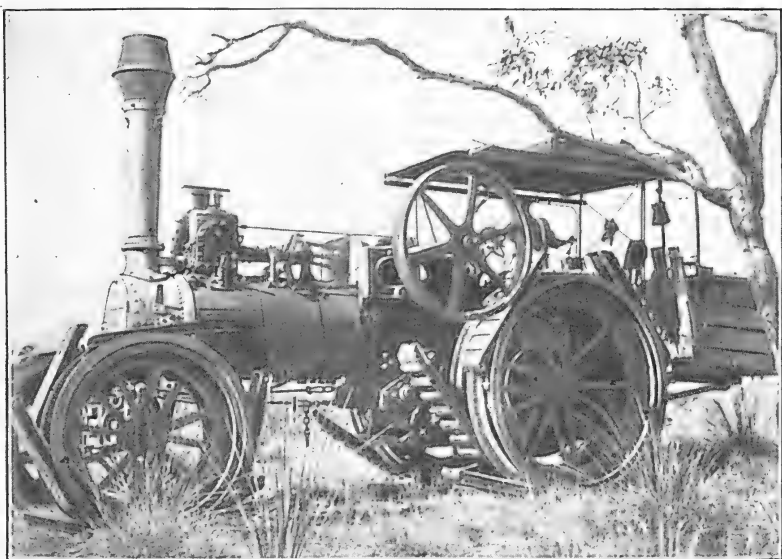
The only plots that look well are those adjoining the saddling paddock; these were treated in November, 1904. No. 1 plot treated with Bethanga pyrites, is still absolutely free of weed, except where a track cut by wood drays crosses it. On this track the weed has firmly established itself once again, but cannot encroach on either side of the track, proving that once the surface was broken by these ruts the rain washed the arsenic out of the soil and allowed the seed (which must be very plentiful in that locality) to germinate. The way in which the plant is confined to this track gives it a remarkable appearance. Plot 2 treated with arsenate of soda is fairly clean but the land is gradually recovering, and the weed is always at hand to grip the spot where rains have leached the arsenic out of it. Plot 3 (Murchison Scrub Exterminator) is the next best, then Plot 5 with Invicta, but the plots treated with Silex and Murton's Dip are both badly covered again with weed.

From the foregoing observations it appears to me that salt comes first as a remedy as it will kill out the weed and its effects on the soil are not so lasting as arsenical preparations or as dangerous, but unless land treated with salt is protected against fresh supplies of seed being blown or washed on to it, it is only a waste of labor. With regard to strong arsenical solutions the Bethanga plot proves that the weed can be utterly destroyed by strong arsenical solutions for lengthened periods—in this instance from 4th November, 1904, up to the present. This treatment would be useful for headlands; the weed growing in the wheel ruts on the Bethanga plot shows that arsenic killed land can be recovered by cultivation which allows the rains to wash out the poison.

CLEARING BY TRACTION ENGINE.

A. S. Kenyon, C.E., Engineer for Agriculture.

One of the difficulties met with in the use of the traction engine on the farm is the inability of the ground to supply sufficient resistance to the driving wheels to prevent them skidding. This is particularly the case after rains, in wet ground, and in sand. It is, of course, evident that the pull of the ploughs, trees, or whatever is being hauled by the engine, must not be greater than the frictional resistance between the ground and the wheel. Many expedients have been devised to overcome the difficulty. The traction engine has been evolved under "old country" conditions for use on good and hard roads, and fails at times when taken into the field. Grips, spikes, widening, and increasing the diameter of the wheels have all been tried. In the Western States of America, traction engines with wheels up to 16 feet in width of face are in use, while others have an arrangement similar to the horse tread-mill whereby they run on a continuous roadbed. In general, it may be said that the best method lies in the direction of wider wheels, though strength of axle considerations puts a practical limit to this.



TRACTION ENGINE WITH DREADNOUGHT ATTACHMENT.

An interesting problem of this kind arose in South Australia, and a satisfactory solution has been found by the adoption of a modification of an old contrivance known under various names, but more commonly as the pedo-rail. At Tintinara there occur large tracts of gum country, interspersed with the smaller grass tree, sedge, and black gum. The soil is white sand overlying clay, with occasional heavy limestone outcrops. Belts of mallee mingled with heathy vegetation show here and there. Large areas of true heath country, honeysuckle, oak, and scrub, are to be

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